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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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I.C.I. Shares for Workpeople

FURTHER particulars have been received this week from Imperial Chemical Industries, Ltd., respecting the scheme announced some time ago for enabling employees to become shareholders in the company on preferential terms. The offer is open to all in the service of the company who have completed twelve months' service and are over 21 years of age. The shares will be allotted at 2s. 6d. below the current market price and payment may be spread over two years, no interest being charged on the amount outstanding. The number of shares to which an employee is entitled varies according to salary and length of service. It is emphasised that the purpose of this scheme is to interest employees in the fortunes of the company by giving them the status of shareholders and that it is not meant to encourage speculation. While the directors have no desire to restrict the freedom of the individual investor, they will not allow the scheme to be used for the purpose of buying and selling in order to catch market profits. In addition to purchase by instalments or for cash of shares up to between 20 and 40 per cent. of a year's earnings according to length of service, the company will give to each purchaser whose wages do not exceed £200 a year, one additional share for every four subscribed, and for those whose wages fall between £200 and £500, one additional share for every five subscribed. The staff of Benn Brothers, Ltd., have long enjoyed privileges of the same kind on even easier terms, and there can be no doubt about the good effect of this policy of giving employees a personal interest in the business.

Another interesting announcement is the resignation by Lord Bledisloe of his post as Parliamentary Secretary of the Ministry of Agriculture to take up the appointment of Chairman of the Imperial Grasslands Association, which is being formed under the auspices of Imperial Chemical Industries with the object of improving the cultivation of pasture land at home and in the Overseas Dominions. Lord Bledisloe is recognised as a first-rate authority on agriculture, especially on stock-raising, and his surrender of an important ministerial office for a private position indicates the importance he attaches to the possibilities of making the land support, by the aid of scientific fertilisation, a greatly increased head of stock per acre.

Overseas Trade Opportunities

Two reports just issued by the Department of Overseas Trade are well worth the attention of chemical exporters. The first deals with the economic and commercial situation of Australia to June, 1927 (pp. 102, 3s.), and is written by Mr. R. W. Dalton, H.M. Senior Trade Commissioner in the Commonwealth of Australia, who reviews the general conditions quite frankly and obviously with extensive and accurate first-hand knowledge. The second is on the financial and commercial situation of Austria to October, 1927 (pp. 48, 1s. 6d.), and the author is Mr. O. S. Phillpotts, Commercial Secretary to H.M. Legation, Vienna.

In the Australian report, it is pointed out that the most significant feature of the figures of distribution of total trade is the somewhat serious decline in the percentage of the import trade of Australia secured by Great Britain, coincident with the maintenance of the share secured by the United States. As British firms have undoubtedly been more active on this market in recent years, and have made greater efforts than ever before to conserve their interests in Australia, the cause of this decline can hardly be ascribed to any lessening of the endeavours of British firms. As regards trade in drugs, chemicals, and fertilisers, the total imports in the year 1925–26 were valued at £4,316,482, as compared with £4,120,460 in the previous year. Imports during the year covered by the report show a considerable increase, especially in fertilisers. This may be regarded as a more or less direct result of the research work that is now proceeding in reference to pasture cultivation and the possibility of securing increased yields by the application of suitable chemical fertilisers.

In the main items mentioned in this section, the United Kingdom holds generally a strong position, but, in some instance, it has to face keen competition from other countries. Of the total imports, for example, of cements and prepared adhesives, amounting to £45,343, the United Kingdom supplied £22,146, as compared with the United States' contribution of £21,305. In cream of tartar, we supplied £160,016 out of a total of £200,029, while France was the principal competitor with £38,708. Proprietary medicines, equalling £251,535, were supplied to the amount of £180,271 by this country and £54,965 from the United States. Drugs and medicinal preparations amounted to £250,642, and of this amount the United Kingdom supplied £171,550 and the United States £34,497. The figures in regard to fertilisers, other than natural and superphosphates, indicate a very wide field for expansion in this industry. The total fertiliser imports amounted to £80,868. This country supplied only £967, while Germany supplied £36,702. The United States, again, supplied £10,337 worth of insecticides and disinfectants, against our total of £6,298. The principal exporter of essential oils was the United States with £39,981, the United Kingdom coming second with £36,421, and Italy third with £25,013. Of perfumery we exported £14,941, as compared with £10,223 from France, and £10,075 from the United States. The £316,959 worth of toilet preparations was nearly equally divided between the United Kingdom, the United States, and France. France was the chief exporter of perfume spirits and bay rum with £32,247, while the United Kingdom exported £19,412, and Germany £18,542. Of chemicals not otherwise specified, the total imports amounted to £1,877,753. Of this total, £102,762 was supplied by the United Kingdom, and £47,410 by the United States.

In the report on Austria, there appears to be no specific reference to chemical industry, but an interesting picture is given of the general conditions of the country. It is encouraging to hear that the last twelve months have shown a distinct quickening in the pace of Austria's recovery. The country is described as fully convalescent, and it should not be imagined that there is still any danger of a sudden economic breakdown. It is, in fact, enjoying "a modest boom," and two new factors justify a certain measure of optimism—the stabilisation of Austrian currency and the steady lowering of tariff barriers.

To Canada and the States

In a little while it is expected that details will be available of the visit which the Society of Chemical Industry and the Institution of Chemical Engineers are arranging to Canada and the United States in August and September at the invitation of the American Section of the Society and the American Institute of Chemical Engineers. On this occasion it is intended to emphasise the "party" character of the visit, and a good example is being set by several influential people who in the ordinary way would travel independently. The party leaves by the *Megantic*, under special arrangements with the White Star Line, on August 11, arriving at Quebec about Sunday, August 19. The tour will cover Shawinigan Falls, Montreal, Ottawa, Niagara Falls, Akron (Ohio), Pittsburgh, Washington, Edgewood Arsenal, Wilmington, and New York. The chemical engineers' conferences will be held at Niagara early in the tour, and the annual meeting of the Society will come at the close in New York. The return voyage will be from New York by the White Star liner *Celtic* on Saturday, September 8. We are asked to state that it would be a great convenience in the making of adequate arrangements if those who contemplate joining the party would communicate early with Dr. Longstaff or Professor Hinchley, the respective secretaries of the two bodies named, as all bookings for the party should go through the official channel.

The Calendar

1928 Feb.		
6	Institution of the Rubber Industry (London Section): "Automatic Controls in Rubber Manufacturing Plant." H. C. Young.	Engineers' Club, Coventry Street, London.
6	Society of Chemical Industry (London Section): "Some Problems Encountered in Making Fine Chemicals." by F. H. Carr. 8 p.m.	Burlington House, Piccadilly, London.
6	University of Birmingham Chemical Society: Lecture by Professor J. F. Thorpe.	University, Birmingham.
7	Institute of Metals (Birmingham Section): "Testing of Metals." Professor F. C. Lea. 7 p.m.	Engineers' Club, Waterloo Street, Birmingham.
7	Institute of Metals (N.E. Coast Section): Demonstration of Mechanical Testing of Metals. J. A. Smythe and C. E. Pearson. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne
8	Institute of Metals (Swansea Section): "Gases in Metals, With Special Reference to Copper." N. Alan. 7 p.m.	Thomas's Café, High Street, Swansea.
9	Society of Dyers and Colourists (Midlands Section): "Action of Alkalis on Cotton and Art Silk." A. J. Hall. 7.30.	University College, Nottingham.
9	Institute of Metals (London Section): "Properties of Metals and Alloys at High Temperatures." R. G. Batson. 7.30 p.m.	83, Pall Mall, London, S.W.
9	Royal Society. 4.30 p.m.	Burlington House.
9	Optical Society: Annual General Meeting. 7.30 p.m.	Imperial College, London.
9	Oil and Colour Chemists' Association: "Malayan Damars, Part II. T. Hedley Barry. "Zinc Chromes." J. J. Fox. 7.30 p.m.	30, Russell Square, London.
9 16	Royal Institution: "From Faraday's Note Books." Sir William Bragg. 5.15 p.m.	21, Albemarle Street, London.
10	Society of Dyers and Colourists (Scottish Section): "The Relation between Laboratory and Bulk Production." Dr. H. H. Hodgson.	Glasgow.
10	Chemical Engineering Group: "Dry Cleaning and Finishing Machinery." E. A. Alliott. 8 p.m.	Burlington House, Piccadilly, London.
10	"Chemistry in Mediæval Islam." Dr. E. J. Holmyard. 5.30 p.m.	University College, London.
10	Physical Society. 5 p.m.	Imperial College,
10	Institute of Metals (Sheffield Section): "Casting." 7.30 p.m.	University, Sheffield.
10	Oil and Colour Chemists' Association (Manchester Section): "Nitro-Cellulose Lacquers—Recent Developments." Dr. Stanley Smith. 7.30 p.m.	Milton Hall, Manchester.
11	Federation Britannique des Comités de l'Alliance Française. Lecture by M. Moureu on "Marcelin Berthelot." 3.15 p.m.	London Day Training College, Southampton Row, London.

Apprenticeship and Training in the Chemical Industry

A Ministry of Labour Report

As a result of an inquiry made by the Ministry of Labour in 1925 and 1926, there has just been issued the "Report of an Inquiry into Apprenticeship and Training for the Skilled Occupations in Great Britain and Northern Ireland, 1925–26. III.—Mining and Quarrying; Metal Extraction; Chemical, Glass, Pottery and Allied Industries." (H.M. Stationery Office. Pp. 110. 3s. 6d.) Below are given the more important points relating to the chemical industry.

In addition to the manufacture of chemicals as ordinarily understood, there have been included, for the purposes of this report, the manufacture of salt, tar, and wood derivatives, dyes, fertilisers, disinfectants, explosives, white lead, paints, varnishes, non-mineral oils, greases, soaps, candles, glues, polishes, gums, ink, and matches. The Census returns show that in Great Britain there were employed in 1921, in these branches of industry, 166,096 male persons and 55,267 female persons, in both cases inclusive of employers and managers. About 13·7 per cent. of the male, and 51 per cent. of the female workers were under 21 years of age.

Classification of the Workers

The workers fall into five main classes: (i) works managers and qualified chemists in control of manufacture; (ii) skilled tradesmen, *e.g.*, fitters, plumbers, electricians engaged in the maintenance of plant; (iii) process workers, skilled and semi-skilled, engaged in manufacturing operations; (iv) labourers assisting the process workers or the skilled tradesmen on the maintenance staff; and (v) other workers, *e.g.*, clerks, transport, and warehouse workers. The bulk of the workpeople are process workers and chemical labourers; the maintenance workers number less than 10 per cent. and the chemists and laboratory assistants less than 5 per cent. of the whole.

A questionnaire was addressed to 410 firms including all the principal firms and to about half of the smaller firms. Returns were received from 381 firms employing about 74,000 male workers, or nearly 45 per cent. of the total male workers in the industry. Only 85, or 22·3 per cent., of these employers were training boy apprentices or learners; no girl apprentices or learners were returned. Of the 1,155 boys in training, 833 were apprentices and 322 were learners. They were all engaged on maintenance or similar work with the exception of 209, who were being trained as chemists. For occupations other than these, the various employers' associations in the industry are satisfied with the present arrangements for the recruitment of skilled workers and do not consider that a system of apprenticeship is necessary.

Recruiting Process Workers and Assistant Chemists

On process work—the principal occupation in the industry—there is no system of apprenticeship; for this work, boys and girls are employed on personal application direct from the elementary schools, at the age of 14 or 15 years, and along with adult chemical labourers assist the process workers in various ways, gradually gaining experience by working in proximity to the plant. At the age of 21 years (or in the case of girls in soap and candle, match, and boot and floor polish manufacture at the age of 18 years) the boy or girl may expect to be promoted to vacancies among the process workers as they occur. Failing such promotion they are employed as chemical labourers.

Boys in training for posts as assistant chemists are usually recruited from the secondary schools at the ages of 16 or 17 years; in most cases they must have matriculated or passed the school leaving examination. About 6 per cent. are indentured apprentices, the remainder being learners or, in some cases, apprentices under verbal agreement. The length of apprenticeship or learnership is normally five years or, for those who do not begin at 16 years, such period as will terminate at the twenty-first birthday. Much, however, depends on success at the qualifying examinations. In the laboratory the apprentice or learner receives his training under the supervision of a qualified chemist, while assisting in the practical work of the factory; attendance at technical classes and private study are definitely encouraged by employers and are essential to success. Many firms also engage, direct from the technical school or university, adult men and women who have passed qualifying examinations. Wages in the first year of training usually range from 10s. to 12s. 6d. per week; in the last year of training the wage most commonly paid is 45s. per week. The normal working week throughout the industry consists of 47 or 48 hours.

Chemical Apprentices and Learners

Of the 1,155 boys about whom details were furnished, all but 209 were engaged on maintenance work, and none on process work. The 209 boys were apprentices or learners in the chemists' laboratories; 13 were indentured apprentices, 27 were apprentices under verbal agreement, and 169 (or 80·9 per cent.) were learners. Employers usually required prospective apprentices to have had a secondary school education, and in some cases they must have matriculated or passed some other examination of equivalent standard before being accepted. In accordance with these educational requirements, more than 80 per cent. of the boys began at the age of 16 or 17; those commencing at 15 years being either apprenticed chemists or laboratory assistants (learners) in the dye industry.

The period of service was usually five years; but in the case of one dye works, where the apprentices commenced at 15 years, the period was only three years, *i.e.*, to the age of 18 years, when the ex-apprentices either passed into the works as supervisors of processes or left the firm in order to study for examinations which would qualify them for posts as works or research chemists. For some laboratory assistants, who lacked the general education or the capacity for intensive application to study, there was no place when adult except as chemical workers in the factory.

In their first year, the wages ranged from 3s. 10d. per week (£10 per annum) to 25s. per week, with an average of 10s. 9d. per week for apprentices and 12s. 10d. per week for learners. All but 32 of the boys received from 10s. to 12s. 6d. per week. In the last year, the wages varied between 15s. and 60s. per week, with an average of 20s. 9d. per week for apprentices and 45s. 3d. per week for learners. Most employers recruited their works or research chemists from among young men and women who had obtained a university degree or who had passed the qualifying examinations of the Institute of Chemistry. Such chemists had devoted their full time to study and research, and the apprentice chemist or laboratory assistant, the exigencies of whose employment limited him to a part-time course of instruction, was, therefore, forced to follow a longer and more difficult path, and might find it impossible to succeed in reaching the status of a professional chemist. At the same time, it was reported that a number of apprentice chemists did ultimately succeed in obtaining university degrees.

Maintenance Work Apprentices and Learners

As regards apprenticeship and learnership for maintenance workers, of 85 firms who returned schedules in connection with this inquiry, 45, including most of the alkali firms, reported that they took definite steps, other than mere verbal recommendation, to supplement the ordinary training of boys which was given at the works by attendance at technical or trade classes. The method most frequently adopted to encourage attendance at such classes was to pay the fees, either unconditionally or subject to satisfactory attendance or progress; this was done by 30 firms.

It was common for boys to be allowed to leave early if necessary, when they desired to attend classes, and technical books or instruments were sometimes given or lent. Eight firms made attendance at evening classes compulsory. In one large firm, special educational classes were held on Saturday mornings, when theoretical and practical instruction was given; there was no deduction from wages, attendance being compulsory; another firm sent its apprentices to technical schools for one day per week during working hours without loss of pay, in addition to requiring attendance at evening classes. Two of the largest chemical firms paid evening class fees and provided books and instruments, and paid 1s. per week extra to those apprentices who had made a certain percentage of the possible number of attendances for two or three years. The welfare department of one firm arranged periodical visits to other works (in addition to afternoon and evening classes) in order to create an interest and widen the outlook of its boys.

Some Interesting Properties of Alloys of Nickel

By W. T. Griffiths, M.Sc., F.I.C.

We give below a summary of an address on "Some Interesting Properties of Alloys of Nickel," given before the Swansea Section of the Institute of Metals by Mr. W. T. Griffiths, of the Research and Development Department of the Mond Nickel Co.

NICKEL is a metal which takes comparatively kindly to admixture with others, and therefore is a constituent of a very wide range of alloys. Amongst these alloys we find in a greater or less degree all those properties for which we make use of metals to-day. It is proposed, however, to deal with those qualities of nickel alloys which are interesting, either because they are possessed in a greater degree by nickel alloys than any other materials, or because they are leading to the replacement of metals previously used by some alloy containing nickel.

Physical Properties

Purely physical properties are dealt with first, because apart from being of considerable interest in themselves, they give rise to many fascinating theoretical speculations.

Magnetic Properties.—Soon after the announcement towards the end of the last century of the value of adding nickel to steel, a very careful investigation of the magnetic properties of nickel-iron alloys was carried out by Hopkinson and others. It was soon discovered that when nickel was added to iron the alloys remained magnetic until about 25 to 30 per cent. of nickel was present, but that at this composition the materials were practically non-magnetic. When the nickel content was increased above 30 per cent. the alloys once more became magnetic and remained so throughout the whole range of compositions up to pure nickel, which is, of course, itself magnetic. About 1920, however, the Western Electric Co. of America announced the discovery of the fact that if certain of the alloys were given a special type of heat treatment they developed a permeability in low magnetic fields which was far in advance of anything previously known. This announcement was soon followed by another from the Gutta Percha Co., who, in this country, took out patents for an alloy containing about 70 per cent. nickel, a little copper and the rest iron, which had some advantages over the plain nickel-iron alloy.

A use for these materials with remarkably high permeability was found immediately in their application to the loading of submarine cables, thus increasing the speed of working in some cables from eight to ten times. All the more recently laid cables have been loaded in this way. The high permeability materials are also used for a number of other purposes, and it is possible that the use of these alloys will grow in various directions.

Dilatational Properties.—While endeavouring to obtain a suitable material for line standards the French investigator, Guillaume, discovered that the coefficient of expansion of the nickel-iron alloy containing 36 per cent. nickel was very small near ordinary temperatures. In addition, he found that the coefficients of the neighbouring nickel-iron alloys varied uniformly with the nickel content.

The material of low coefficient, which was given the name "Invar," has been much used for line standards of length and for such purposes as surveyors' tapes and clock pendulums and mechanisms. A recent use of this alloy, which seems likely to develop, was in connection with parts of machinery working at high temperatures, where it was employed for equalising the expansion of two neighbouring members made of different metals or alloys. Thus, the expansion of an aluminium alloy section may be made equal to that of a steel bolt passing through it by introducing under the bolt a collar of "Invar" of such a length that the expansion of the aluminium, plus that of the "Invar," is equal to that of the steel.

Electrical Resistivity.—Several of the nickel alloys are used for electric resistance purposes, more particularly those with copper, with chromium and with copper and zinc (the nickel-silvers). The nickel-chromium alloys have a very high electrical resistance and their use for electric resistance heating purposes will be referred to later on.

Theoretical Considerations

The above-mentioned magnetic, dilatational and electric resistance properties are quite interesting from a theoretical point of view, in that no generally accepted explanation for them has yet been put forward.

In the case of the nickel-iron alloys, all those which contain more than 30 per cent. nickel have only one phase and show only one micro-constituent under the microscope. It is undoubtedly true, however, that transformations take place in them, these changes taking place without any change of phase. As to what the transformations are, we have no information as yet. The nickel-copper alloys also, although they form a uniform series of solid solutions, within certain ranges of composition possess transformations, the nature of which is obscure.

Corrosion-Resisting Properties

Nickel itself possesses a considerable degree of resistance to corrosion, and this property it passes on to its various alloys. With copper we get a series of alloys which generally increase in resistance to corrosion as the nickel content rises, and the whole range is being increasingly utilised in a number of directions where the materials previously used were continually giving rise to troubles, owing to slight corrosion effects. An important development of this kind has been in the replacement of brass tubes by nickel-copper tubes for condenser work. The condenser tube problem has been one which has troubled both engineers and metallurgists for some years back, but recent long-period tests which have been carried out seem to indicate that a solution of this problem is possible by the use of nickel-copper alloys containing 20 per cent. or more of nickel. Several of the large steamship companies have specified these alloys for their condenser plant. In general, an alloy containing 20 to 30 per cent. nickel is sufficiently resistant, but where severe conditions are experienced the higher nickel alloys containing up to perhaps 45 per cent. nickel are being found necessary.

The 45 per cent. nickel alloy, owing to its silver-white appearance and its resistance to the corrosion of foodstuffs, fruit juices, etc., is being utilised to a considerable extent for such purposes as wall, cupboard, and sink linings in railway restaurant cars and hotel kitchens, while it has also been adopted for ornamental metal fittings.

With higher nickel contents still we get a range of alloys which, owing to their combination of strength with corrosion-resisting properties, have been found quite valuable in a number of directions. The 70 per cent. nickel alloy typified by the English alloy "Corronil" and the American "Monel Metal" has very wide applications for such purposes as dyeing and laundry machinery and chemical plant. One interesting recent use has been for the exhaust ring of an aero-engine, where considerable atmospheric corrosion was experienced as well as attack by the hot exhaust gases.

Corrosion-resisting Steels.—The corrosion-resisting properties conferred on steel by the addition of 12 to 14 per cent. of chromium have now been known for some time, and the so-called "stainless steel" cutlery is in evidence everywhere. This steel, although sufficiently resistant to certain agents, has a very limited application when introduced into the chemical industry. In addition, its corrosion-resisting properties are only marked after a suitable heat treatment, and troubles are experienced in making up plant owing to this feature. It is found that if a certain amount of nickel is added to the steel, the chromium content is raised somewhat, and the resulting material has much improved corrosion-resisting properties. Being austenitic it can be fabricated without losing these properties unduly.

We have, therefore, a range of steels containing between 16 and 20 per cent. of chromium, and from 11 to 6 per cent. of nickel, which are being increasingly utilised in the chemical industries. It may be emphasised that the composition of the material can reasonably be varied with the purpose for which it is adopted. As the nickel content increases, so the ease of working improves, an important feature with these steels which are liable to harden up with "work." In cases, therefore, where an increased nickel content is allowable it is advisable to have more nickel present, since fabrication

difficulties are thereby diminished. The higher nickel content increases resistance to attack by sulphuric acid and certain other agents, but lowers the resistance to nitric acid. In using the materials it is necessary to consider what the corrosion problem really is and, if possible, to suit the steel composition to it. A variety of compositions are available from the various steel makers.

Oxidation and High Temperature Resisting Steels.—Increasing the nickel content of the nickel-chromium steels until it is above 25 per cent. gives rise to a series of materials which are of interest because of their resistance to oxidation, and also owing to their strength at temperatures above normal. Steels such as these are being used to an increasing extent for such purposes as valves for aero-engines and Diesel engines, parts of gas turbines and continuous conveyors inside high temperature furnaces.

Nickel-Chromium-Iron and Nickel-Chromium Alloys.—With the nickel content over 60 per cent. one obtains a range of alloys containing chromium and iron which are used to a large extent, principally in the cast form, for such heat-resisting purposes as case-hardening boxes, etc. These alloys are also used for low-temperature heating elements in electrical heating.

Eliminating the iron entirely results in alloys which are probably the most resistant to oxidation of any yet available. The usual compositions are 80 to 85 per cent. of nickel, together with 20 to 15 per cent. of chromium. Owing to their combination of oxidation resistance, high electrical resistivity and strength at high temperatures, these alloys are ideal for electrical resistance heating. Not only are they being increasingly used for domestic purposes, but their recent improvements have made possible the introduction of industrial electric furnaces of considerable size.

Industrial heating by electrical resistance has several advantages over the more usual coke-, oil- or gas-fired methods. With proper design the heat is generated inside the furnaces and a very large percentage of it goes into the job. Walls, roofs, and floors can all be conveniently heated and there is very little loss of heat through the walls of the furnace, while no intervening fire brick has to be heated up, as in the case of other fuels.

Mechanical Properties at Elevated Temperatures

A brief reference may be made to the properties of the various alloys containing nickel at temperatures above normal. Nickel appears to be an essential constituent of most of the materials which have, up to the present, shown any outstanding properties at high temperatures. The nickel-copper alloys, the nickel-chromium steels, the nickel-chromium-iron and especially the pure nickel-chromium alloys are all outstanding in this respect.

It is being realised that the most important property at high temperatures is not any of the usual ones measured at ordinary temperatures, but what is known as the "creep stress." It is found that at temperatures above 300° to 400° C. all metals so far tried extend continuously under loads much lower than the maximum stress which they break at when this is applied rapidly. The extension sometimes continues for several months, the specimen finally breaking under comparatively small loads. Opinion is divided as to whether extension really ceases at any load when the temperature is higher than a certain value, but it has been shown that certain alloys "creep" at such a low rate at certain stresses that they may be considered capable of withstanding those stresses in practice. Alloys containing nickel have shown higher "creep" stresses than most other materials tested, and the nickel-chromium alloys in particular have given very promising results.

It is, therefore, seen that amongst the alloys of nickel we have materials with most interesting magnetic properties, alloys which have very small and certain other useful co-efficients of expansion, alloys with the lowest thermal co-efficient of electrical resistivity, materials which have the greatest resistance to most types of corrosion, and some of the best resistors to oxidation and the effect of high temperatures that have been obtained. It appears that with the higher demands resulting from present day progress, the growing necessity for stronger materials at ordinary and high temperatures, for materials more resistant to corrosion and oxidation, nickel alloys will be more and more in demand.

Dry Cleaning and Finishing Apparatus

The User's Point of View

THE various factors involved in the process of dry-cleaning were discussed in a paper on "Dry Cleaning and Finishing Apparatus," read by Mr. A. I. Hatfield (of Achille Serre, Ltd.) at a meeting of the London Section of the Society of Dyers and Colourists, at the Dyers' Hall, Dowgate Hill, London, E.C., on Friday, January 27, in which the Chemical Engineering Group of the Society of Chemical Industry co-operated. Mr. Hatfield also discussed an improved process of dry-cleaning which has been developed in collaboration with Mr. E. A. Alliott (of Manlove, Alliott and Co., Ltd.).

The vacuum type of washing machine, said Mr. Hatfield, had great advantages over the open type, from the point of view of safety and hygienic working, improved spirit economy, increased penetrative power of the solvent and better cleaning of the goods. Attempts had been made to clean, hydro-extract and dry the goods in one machine. This had very much reduced the solvent losses, but it was found more satisfactory to wash and hydro-extract in one machine, and to dry separately in a less costly machine.

The most satisfactory spirit he had found for cleaning, when the vacuum type of washer was used, was a special spirit from which the high and low boiling fractions had been stripped. This was costly, but, with a properly designed vacuum system, the losses due to evaporation, etc., were small, and the extra first cost, therefore, was of little importance. It had adequate solvent action, and was rapidly removed from the dry-cleaned goods in the subsequent drying operations.

The New Process

The new process described by Mr. Hatfield was one in which the goods to be cleaned were continually flushed with very large quantities of pure, clean solvent which was practically freed from all bacteria, etc., and contained special soaps which were extremely effective in removing stains of all kinds. It incorporated the use of a very high capacity pump, and filters and filter aids, so that the dirty solvent was filtered very rapidly and economically for re-use.

The process could be applied to the open type of washer, but the use of vacuum type washers constituted a great improvement. The goods treated were absolutely freed from dirt. The germ life was washed out of the goods, and into the filter, and not permitted to return. The soap in the solvent replaced some of the soluble oils, etc., which normally would be washed out in the dry-cleaning process. The use of the process enabled the output per unit of labour, power, floor space, etc., to be very greatly increased, and soap losses to be greatly reduced.

Economics of the Process

Whereas in the case of the process used previously—in which the solvent was dealt with by clarifying chemically and not by filtration—the cost of soap per batch of goods was 6s. 1d., and the cost of the clarifying agent 1s. 4d., in the new system the cost of special soap per batch was 1s. 5d., and the cost of the filter aid was 11d. so that the comparative total costs of materials other than solvent were 7s. 5d. and 2s. 4d.—a saving of 5s. 1d. per batch. The output from a pair of 6 ft. vacuum washers fitted with the process was about 7,200 batches per annum, and on that basis the saving in soap would amount to about £1,830 per annum. With the old system each batch was hydro-extracted after each of the three or four baths, whereas with the new system only one hydro-extraction was necessary, with very few exceptions. The washing time was cut down very considerably, and the power required for the process was small, approximately double the production being obtained with very little increase in power.

Professor J. W. Hinchley reminded Mr. Hatfield that the filtration of dry-cleaning liquors could be effected quite well with the streamline filter.

Mr. Hatfield agreed, and said there was a big future for the streamline filter in the treatment of these liquors.

At the conclusion of the meeting, Mr. Alliott acknowledged the great part Mr. Hatfield had played in the development of the new process, and said it was Mr. Hatfield's special knowledge of dry-cleaning, and his appreciation of the chemical engineering side of the problem, which had enabled the matter to be brought to a successful issue.

The Hexyl Resorcinol Appeal

The Nature of a General Reaction

THE hearing of the appeal by Sharpe and Dohme, Inc. against the judgment of Mr. Justice Astbury, in their action with Boot's Pure Drug Co., Ltd., was continued during this week, when Mr. Whitehead (for the respondents) cited authorities for the view that even before the 1919 Act chemical patents were essentially for the "means of the production" of the chemical substance. Section 38a clearly showed that the process as such must be one which could form the subject of a patent. If the process were not patentable, then the granting of a patent for the production of a new chemical substance, would lead to the absurd result that a man would be entitled to carry out the old process (which being not patentable was available to all the world), but he would be restrained from possessing or disposing of the result of carrying out that process. Section 38a prevented such an absurd position arising, by prohibiting the claiming of any chemical substance except it be made by the special process described and claimed.

Mr. Whitehead pointed out that Mr. Justice Astbury had really decided the issue on the ground of lack of patentable subject matter. The document completely disclosed the alleged invention, and there was no inventive step left for the plaintiffs to take.

On the question as to the interpretation of the cited documents, Mr. Whitehead emphasised that the duty of construing them was on the Court who were entitled to the assistance of experts as to the true meaning of scientific words, but it was not permissible to ask an expert what a document meant to him.

Definition of a General Reaction

In reply to Lord Justice Lawrence, Mr. Whitehead defined a general reaction as follows: "When a chemical 'A' reacts in a similar way with a number of bodies, each of which contains a radical 'B,' and from the nature of the reaction there is a reasonable expectation that 'A' will react with other bodies which also contain radical 'B,' the reaction may be termed a general reaction." Mr. Whitehead added that "the 'expectation' varies in degree with the nature of the reaction, and as the number of bodies proved to react increases; and may become practically a certainty." He explained that in the instance before the Court that the body "A" in the first part of the action was resorcinol, and the radical "B" was the carboxyl radical. In concluding his speech he drew attention to Sir William Pope's exhibit headed "Abortive attempts to prepare Hexyl Resorcinol." Sir William had found it quite reasonable to make a number of chemical analogies in these attempts, which involved taking far greater steps than were required in going from the anticipatory documents to the plaintiff's specification, and yet he refused to take the small step of going one stage further up a homologous series.

New President-Nominate of the S. C. I.

MR. ARTHUR D. LITTLE, of Cambridge, Massachusetts, U.S.A., has been unanimously nominated by the Council of the Society of Chemical Industry for election as president of the Society for the year 1928–29. Mr. Little is a well-known chemical engineer and a member of the Research Information Service of the National Research Council of the United States. He is a specialist on the chemistry of cellulose, paper-making and the processes of fibre treatment, etc., and is the inventor of processes connected with artificial silk production and other matters. He was president of the American Chemical Society, 1912–14, and of the American Institute of Chemical Engineers in 1919. Since 1909 he has been president of A. D. Little, Inc.

Safeguarding Act: Methyl Chloride and Radium Compounds

THE Board of Trade give notice that representations have been made to them under Section 10(5) of the Finance Act, 1926, regarding the exemption from duty of methyl chloride and radium compounds. Any person desiring to communicate with the Board of Trade with respect to these representations should do so by letter addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, within one month from the date of this notice (February 1.)

The New Steam-raising Plant at Billingham

A Criticism and a Reply

WE published last week an account, supplied by the Bureau of Fuel Economy and Technology, 22, Abbey House, Westminster, S.W.1, of a new high-pressure steam-raising plant which is being installed at the Billingham works of Synthetic Ammonia and Nitrates, Ltd. We have received two communications criticising some of the claims made in the article, and mentioning cases in which the pressures are reported to be higher. In reply to these communications, Mr. Alexander H. Hayes, manager of the Bureau of Fuel Economy, writes:—

"The plants referred to in the communication sent to you from this Bureau dealt exclusively with commercial units only. We are quite aware that there is a considerable amount of experimental work being carried out with high pressure boilers, such as the Loeffler, Blouquist, and Benson, but no actual commercial results have been obtainable on these, for the reason that they are in an experimental stage.

"At Klinenberg, one of the finest and most modern stations, the pressure employed is below 500 lb. At the Kansas City plant, working at 1,400 lb. pressure, only two boilers are being operated.

"In practically every instance where high pressure is being employed, one boiler is being operated, whereas the synthetic ammonia plant will consist of six boilers at 800 lb. pressure each. We contend, therefore, that our statement that this is the largest industrial high-pressure unit in the world is correct.

"We are quite aware also that many statements are made in the Press as to the great achievements of new types of boilers, but the statements made are based on experimental work only and not on plants in commercial operation. We have ourselves had under observation for the last two years a new type of boiler for which great claims have been made, but these claims again have been based on purely experimental units, and we have, therefore, not considered that the publication of results obtained would serve any practical purpose."

Organic Colours for Rubber

Paper by Dr. W. J. S. Naunton

AT a meeting of the Manchester Section of the Institution of the Rubber Industry, held on January 26, a paper entitled "Organic Rubber Colours" was read by Dr. W. J. S. Naunton, of Imperial Chemical Industries, Ltd., Mr. Charles Paine presiding.

Dr. Naunton first gave a brief account of the manufacture of dyes and the conversion of water-soluble dyestuffs into colour lakes. The various points to be considered in the selection of dyestuffs for use in rubber and the routine control of the selected colours were then described. The application of these pigments was dealt with in regard to their uses in latex, soft rubbers and ebonite. The development of the electro-deposition processes has given rise to a demand for coloured pigments of particle size comparable with that of the rubber particle in latex. Special methods of dispersion must be employed in the production of these colours, and their colloidal stability must be assured as far as possible by the use of carefully selected protective colloids. In addition to the production of straight coloured rubbers, the various conditions necessary for the successful production of jazz-effects, metallic lustre effects and transparent rubbers were considered.

The successful production of coloured ebonite with a good cheesy cut was not easy, but excellent coloured ebonites of modified properties could be obtained by recently patented processes. Dust mouldings and mixed ebonite-synthetic resin were interesting at the present time, but as far as formaldehyde-phenol resins were concerned their retarding action gave rise to difficulties. On the whole, the organic colours served a very useful purpose in rubber technology, and their use had rapidly extended since organic accelerators had come into universal use.

The paper was supplemented by experiments demonstrating the movement of the rubber particles in an electric field, and the use of the ultra-microscope in the study of finely dispersed colours.

From Week to Week

SIR MAX AND LADY MUSPRATT arrived from Ceylon at Plymouth on Friday, January 27.

FATAL INDUSTRIAL ACCIDENTS reported during December, 1927, included 4 in chemical, etc., factories and workshops.

SIR ALFRED MOND arrived at Telaviv on January 30, and was present at the laying of the foundation stone of the Nathan and Lina Straus Health Centre.

SYNTHETIC AMMONIA AND NITRATES, LTD., have placed an order with Dorman, Long and Co. for a further batch of 20,000 tons of constructional steel for use in the extension of the Billingham works.

DR. C. E. K. MEES, director of research to the Eastman Kodak Co., has been elected chairman of Section C (chemistry) of the American Association for the Advancement of Science for the present year.

THE LONDON SECTION of the British Association of Chemists will hold a concert at Broad Street Station Restaurant, at 7.30 p.m. on Friday, February 10. The annual dinner of the London Section will be held on March 3.

DISEASES OF OCCUPATION reported in December, 1927, under the Factory and Workshop Act or under the Lead Paint (Protection Against Poisoning) Act, 1926, included 2 cases of aniline poisoning and 2 of arsenical poisoning.

SALES OF NITRATE OF SODA reported by the Producers' Association during the fortnight ended January 15, amounted to 24,232 metric tons for shipment up to June, 1928, and 25,908 metric tons for delivery in the 1928-29 nitrate year.

THE INSTITUTE OF CHEMISTRY will hold its annual general meeting on Thursday, March 1. The Institute has issued in monograph form the 1927 Streatfeild Memorial Lecture, delivered by Mr. O. F. Bloch, and also an account of the jubilee celebrations, held December 14-15, 1927.

LEWENZ AND WILKINSON, LTD., of 25, Victoria Street, London, S.W.1, have been appointed sole agents for Great Britain and Northern Ireland for Keiser and Schmidt, Charlottenburg, for the sale of pyrometers and resistance thermometers of all descriptions manufactured by that firm.

AN AGREEMENT HAS BEEN CONCLUDED between the Polish Government and the Naphtha Syndicate by which the latter will advance sixteen millions and the Government four and a-half million zloty, for increased naphtha exploitation, but only the interest on the money will be used, and the capital remain untouched.

THE SOCIETY OF GLASS TECHNOLOGY held its first 1928 meeting in the College of Technology, Manchester, on Wednesday, January 18, the president, Mr. W. Butterworth, senior, being in the chair. The following subjects were discussed: "The Design and Operation of Glass Furnaces"; "The Refining of Glass"; and "The Manufacture and Use of Glasshouse Pots."

A MEETING OF THE TEES POLLUTION JOINT COMMITTEE, consisting of manufacturers, ironmasters, and other industrialists and representatives of the Tees Fishery Board was held at the offices of the Tees Conservancy Commission at Middlesbrough on Wednesday, to consider the problem of the pollution of the Tees. Four members of the Department of Scientific and Industrial research attended, including Dr. H. T. Calvert.

M. MOUREU, the eminent French chemist, Membre de L'Institut, professor at the Collège de France, and head of the research station at Meudon, will deliver a lecture on Berthelot, at the London Day Training College, Southampton Row, London, W.C.1, on Saturday, February 11, at 3.15 p.m. The lecture will be given under the auspices of the Federation Britannique des Comités de l'Alliance Française. At 1 p.m. on the same day M. Moureu will be entertained to lunch. Admission to the lecture is free. Details may be obtained from Miss Salmon, 14, Morgan Road, Reading.

UNEMPLOYED INSURED PERSONS at December 19, 1927, in chemicals manufacture in Great Britain numbered 5,510 (males 4,835, females 681); in explosives manufacture, 1,024 (males 748, females 276); in paint, varnish, red and white lead manufacture, 841 (males 689, females 152); in oil, grease, glue, soap, ink, match, etc., manufacture, 4,520 (males 3,758, females 762). The numbers of insured persons in Great Britain and Northern Ireland in the same industries were 72,860, 12,900, 14,380, and 59,160 respectively. The percentages unemployed in Great Britain only were 5·8, 5·4, 4·5, and 5·7 respectively.

SPEAKING ON "The Chemist's Commandment" at Plymouth Rotary luncheon on Friday, January 27, Mr. Raymond R. Butler, head of the department of chemistry at the Technical College, Plymouth, said that the optimism with which the British chemical industries welcomed 1928 would be translated into reality if the doctrine "Thou shalt not waste" was made to apply to the three essentials—materials, methods, and men. They had learned that the research department paid, and if they applied this ideal of excellence to the elimination of the square peg from the round hole, as regards man-power, the chemical industry of Britain would grow as a national asset.

THE POTASH RESEARCH INSTITUTE has been transferred from Stassfurt to Berlin.

AN INSTITUTE for the scientific investigation of coal is to be formed in Prague, Czechoslovakia.

INDIAN INDIGO exports for November, 1927, amounted to 53 cwts., compared with 57 for the corresponding month the year before.

RECENT WILLS INCLUDE:—Mr. Percy Edgar Wickham, Keston, Kent, of R. B. Brown and Co., chemical merchants, of Finsbury Square, London, E.C., £38,017.

THE TRANSFER OFFICES of Ship Canal Portland Cement Manufacturers, Ltd., Greaves, Bull, and Lakin (Harbury), Ltd., and the Holborough Cement Co., Ltd., have been removed to 5, Lothbury, E.C.2.

IT IS OFFICIALLY STATED that practically the whole of the 8,000 acres of sugar beet required as a condition for the erection of a factory at Bridgwater, Somerset, has been contracted for by the farmers in the counties affected.

THE JAPAN CHEMICAL INDUSTRY ASSOCIATION, the largest organisation of the kind in Japan, has decided to start a movement to urge the Government authorities to adopt positive measures on the promotion of chemical industry.

JOHN DOUGLAS BARRATT, aged 33, works chemist at the Hull works of Major and Co., Ltd., was caught in some shafting at the size shed of the works last week. When removed he was taken to hospital and found to be severely injured.

MR. HORATIO BALLANTYNE, F.I.C., has been elected to a seat on the board of Lever Brothers, Ltd. Consequent upon this appointment Mr. Ballantyne is relinquishing the consulting practice which he has carried on for many years at 75, Chancery Lane, London, W.C.2.

THE LONDON SECTION of the Institute of Chemistry will hold its annual dance at the Hotel Russell, Russell Square, on Wednesday, February 15, at 7.30 for 7.45 p.m. Tickets (7s. 6d. single, 14s. double, including refreshments) can be obtained from the hon. secretary, Mr. E. B. Hughes.

CORNWALL COUNTY COUNCIL invites tenders for the supply for the year ending March 31, 1929, of bitumen, refined tar and compounds, cylinder and lubricating oils, etc. Details are available from the County Surveyor, Mr. E. H. Collcutt, at the County Hall, Truro, to whom tenders must be delivered not later than Monday, February 6.

UNIVERSITY NEWS.—*London*: Mr. M. E. Delafield has been appointed to the University Chair of Chemistry as applied to Hygiene, tenable at the London School of Hygiene and Tropical Medicine.—*Edinburgh*: Professor Sir James Walker has intimated his intention to retire from the Chair of Chemistry at the end of the current academic year.

THE SOUTH AFRICAN CHEMICAL INSTITUTE has sent us a copy of its *Proceedings* for September, 1927, including a list of members. The president of the Institute is Dr. B. de C. Marchand. At June 30, 1927, there were 92 members, 36 associates, and 23 students. The council has approached the Government with a view to the introduction of a Bill under Government auspices to effect the registration of chemists.

THE TWENTY-SECOND ANNUAL London Parade of Commercial Motor Vehicles organised by the Commercial Motor Users Association (Incorporated), with the object of encouraging drivers to take a personal interest in the driving and condition of their vehicles, and to run them without accident, will take place on Saturday, March 31, 1928. Full particulars may be obtained on application to Mr. F. G. Bristow, general secretary, the Commercial Motor Users Association, 50, Pall Mall, S.W.1.

CONSTRUCTION IS TO BEGIN in the spring of new buildings for the Battelle Memorial Institute at Columbus, Ohio, a laboratory for scientific and industrial research which is to be run on the lines of the Mellon Institute. Dr. Gerald Wendt, Dean of the School of Chemistry and Physics at the Pennsylvania State College, has been appointed director of the new Institute, which is endowed with a large bequest from Colonel John Gordon Battelle, a well-known figure in the steel and non-ferrous industries of Columbus.

THE LITTLE BOOKLET, *Patents for Inventions*, which has long been issued for the guidance of intending patentees by the well-known firm of patent agents, King's Patent Agency, Ltd., has just been reprinted in its seventeenth edition. This marks the completion of nearly forty-two years of active practice in all matters relating to the patenting of inventions and the registration of trade marks, designs and copyrights; and the booklet, of sixteen pages, gives a résumé of patent practice that places the would-be patentee in the possession of a clear understanding of the principles of patent protection. The brochure is obtainable by prospective patentees from the office of the firm at 146A, Queen Victoria Street, London, E.C.4.

Obituary

MR. R. P. SELLON, managing director of Johnson, Matthey and Co., the well-known manufacturers of precious metals and metallic salts.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

282,548. Azo Dyestuffs. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, and H. W. Moss, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, December 7, 1926.

These dyes have the general formula—

$$\begin{array}{l} N{=}N.R'.N{=}NR'' \\ \quad\quad\quad\quad\quad\quad | \\ \quad\quad\quad\quad\quad\quad D \\ \quad\quad\quad\quad\quad\quad | \\ \quad\quad\quad\quad\quad\quad N{=}N.R''' \end{array}$$

where D is a diamine of the benzidine series, R′ is a periaminonaphthol sulphonic acid, R″ is a benzene nucleus containing a free amido group and R‴ is α-naphthylamine or its 6- or 7-sulphonic acid, or the technical mixture of these acids. To produce the dyes, a diazotised nitro amine of the benzene series or a derivative including the sulphonic and carboxylic acids, is coupled with a periaminonaphthol sulphonic acid in mineral acid solution. The product is further coupled in an alkaline medium with one molecular proportion of a tetrazotised 4 : 4′-diamino-diphenyl which may contain other substituent groups and the diazo-disazo product is coupled with α-naphthylamine or its 6- or 7-sulphonic acid, or a mixture of these, and the nitro group is reduced in an alkaline medium. Alternatively, the nitro group may be reduced after the first coupling. The order of the couplings may be varied, *e.g.*, by coupling the tetrazotised diamino-diphenyl with α-naphthalamine or its 6- or 7-sulphonic acid, and then with the azo dye from the nitroarylamine and the periaminonaphthol sulphonic acid, and finally reducing the nitro group. Instead of a nitroaryl amine, the monoacetyl derivative of the corresponding diamine may be employed, the reduction of the nitro group being replaced by alkaline hydrolysis to remove the acetyl group. The dyes give bluish-black shades on cotton, which can be diazotised on the fibre and developed to give black shades fast to light and washing. A number of examples are given.

282,559. Carrying out Exothermic Chemical Reactions. E. C. R. Marks, London. From the Selden Co., 339, Second Avenue, Pittsburg, Pa., U.S.A. Application date, January 10, 1927.

The process is applicable to vapour phase catalytic reactions such as the oxidation of naphthalene to phthalic anhydride, and anthracene to anthraquinone. In the catalytic oxidation of naphthalene, the optimum temperature is 400°–450° C., and the excess of heat must be absorbed to keep the temperature down to this. Mercury has been proposed for this purpose, but its boiling point is too low and its cost too high, while its specific heat and conductivity are low, and it is subject to oxidation. In this invention, a mixture of metals is employed, one or more having boiling points below the desired temperature, and one or more having boiling points above that temperature. It has been found that a mixture of metals having a boiling point of about 405° C., corresponding to a working reaction temperature of 425° C., can be obtained by using 30 per cent. of lead (boiling point 1,525° C.), 30 per cent. of tin (boiling point 2,270° C.), and 40 per cent. of mercury (boiling point 357° C.). The thermal conductivity of this mixture is relatively high. Another mixture having a similar boiling point consists of cadmium 25 per cent. and mercury 75 per cent. The metallic vapour is condensed away from the reaction zone, and the liquid metal is returned.

282,573. Water Gas and Hydrogen, Production of. Synthetic ammonia and Nitrates, Ltd., Billingham, Stockton-on-Tees, and H. A. Humphrey, Billingham, Stockton-on-Tees, Durham. Application date, February 22, 1927.

The process is for the utilisation of semi-coke from low temperature carbonisation to obtain water gas and hydrogen. Coal, preferably of high caking properties, is preheated in the presence of oxygen to control its caking properties, and the product carbonised below 600° C. to produce a large proportion of lump semi-coke. The coke is treated with steam at a high temperature in a water gas generator, and the resulting gas, containing undesirable hydrocarbons such as methane, is treated with steam at a high temperature to convert the hydrocarbons into carbon monoxide and hydrogen. Alternatively, the semi-coke may be heated to 800°–900° C. to drive off remaining volatile matter before treatment in the water gas generator. The gaseous mixture of carbon monoxide and oxygen may be treated at 200°–300° C. in the presence of finely divided iron to produce higher paraffin hydrocarbons. These may be separated, the mixture compressed, and any methane removed and the gas passed over a catalyst such as basic zinc chromate to produce methanol. The original gas mixture or the above residual gas may, alternatively, be treated with steam in the presence of iron oxide at 500° C. to convert the carbon monoxide into hydrogen and carbon dioxide, the latter is removed, and the hydrogen mixed with nitrogen for the synthesis of ammonia.

282,852. Vat Dyes, Manufacture of. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, and S. Thornley, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, September 2, 1926.

Vat dyes and intermediates are obtained by the condensation of flavanthrone with hydroxylamine or its salts in the presence of sulphuric acid with or without a metal or metallic salt as condensing agent. The condensation product may be treated with acylating agents. In an example, flavanthrone is dissolved in concentrated sulphuric acid, ferrous sulphate crystals are added, and then hydroxylamine hydrochloride, and the temperature raised to 165° C. The mixture is poured into water and filtered and the residue washed and dried.

282,853. Anthraquinone Derivatives, Manufacture of. O. Y. Imray, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, September 21, 1926.

Amino-anthraquinones and their derivatives, *e.g.*, amino-anthraquinone sulphonic acids, amino-halogen-anthraquinones, and amino-methylanthraquinones are converted into alkylated or aralkylated derivatives in good yield by treating with an aliphatic or aromatic aldehyde in the presence of formic acid. The same products are obtained when amino anthraquinone is treated with an aldehyde, followed by formic acid, or by formic acid followed by an aldehyde. The products may be used as dyestuffs or for the manufacture of other dyestuffs by reduction, saponification, sulphonation, etc. Examples are given of the treatment of 1-amino-4-nitroanthraquinone, 1 : 4-diamino-anthraquinone, 1 : 5-diamino-4 : 8-dinitro-anthraquinone, 1-amino-4-anilido-anthraquinone, a mixture of 1 : 5- and 1 : 8-diamino-anthraquinone, 1 : 4-oxyamino-anthraquinone, 2-amino-anthraquinone, 1-amino-anthraquinone, and a mixture of diamino-chrysazine-sulphonic acid and diamino-anthrarufin sulphonic acid.

282,863. Isatin Derivatives and Indigoid Dyestuffs Therefrom, Manufacture of. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 25, 1926.

These isatin derivatives are soluble in water and can be combined with a reactive keto methylene compound, such as naphthol, oxythionaphthene, indoxyl, acenaphthenone, etc., to obtain indigoid dyestuffs. They are obtained by the action of sulphites on isatin-α- chlorides, their substitution products or homologues. They can also be obtained by treating dehydro-indigo-bisulphite compounds with weakly alkaline agents such as sodium carbonate, an alkali sulphite, borax, or very dilute caustic alkali. The treatment with the alkaline agent is not continued beyond the stage at which the indigoid dyestuff is completely formed. The dihydro-indigo-bisulphite compounds produced by the reaction of dehydro-indigo-acetates with sulphites need not be isolated, but may be further decomposed in solution as above, so that the isatin derivatives

are directly obtainable from the dehydro-indigo-acetates. These compounds contain sulphur and nitrogen in the atomic proportions of 2 : 1 and are resistant to hot acids but are decomposed by concentrated mineral acids to form the corresponding indigo. Examples are given of the treatment of 5-chlor-isatin-α-chloride with sodium sulphite and the condensation of the compound with α-naphthol to obtain 2-naphthalene 2-chlorindol-indigo ; the treatment of dehydro-indigo-bisulphite with sodium carbonate and tetrabromo-dehydroindigo bisulphite with sodium sulphite.

282,892. VULCANISING RUBBER, PROCESS FOR. W. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 30, 1926.

Rubber is vulcanised in the presence of formamide and zinc oxide for about 1 hour at 140° C. A suitable mixture consists of raw rubber 100 parts, zinc white 10 parts, sulphur 5 parts, formamide 1·5 parts.

282,907. ORTHO-ANISIDINE AND SIMILAR AMINO-PHENOL ETHERS, MANUFACTURE OF. J. Tcherniac, 49, Palace Road, Streatham Hill, London, S.W.2. Application date, October 2, 1926.

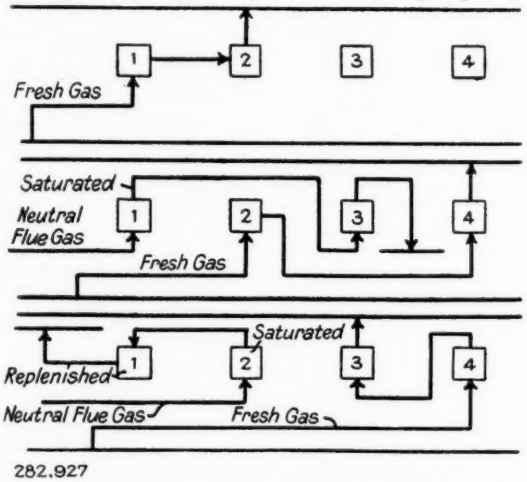
It is known that when methyl-salicyl-amide is treated with alkali hypochlorite at ordinary temperature there is first formed a mono-chloramide which remains in solution as an alkali salt. It is now found that if the solution is heated in the presence of caustic alkali, ortho-anisidine is produced. These reactions are represented by the equations

$$C_6H_4OCH_3.CONH_2 + NaOCl = C_6H_4OCH_3.CONClNa + H_2O$$
$$C_6H_4OCH_3.CONClNa + NaOH + H_2O = C_6H_4OCH_3.NH_2 + NaCl + NaHCO_3$$

In carrying out the invention, the alkyl-oxyaryl-carboxylic acid amide is treated with a hypochlorite containing a caustic alkali and the mixture heated. The ether is removed from the aqueous liquid and purified, or it may be distilled. An example is given.

282,927. MIXED PHOSPHATIC FERTILISERS, MANUFACTURE OF —AND RECOVERY OF AMMONIA FROM INDUSTRIAL GASES. H. Hollings, 10, Orchard Drive, Blackheath, London, S.E.3, and The Gas Light and Coke Co., Horseferry Road, Westminster, London, S.W.1. Application date, October 19, 1926.

Phosphoric acid or its equivalent such as superphosphate, or ground mineral phosphate mixed with free phosphoric or



282,927

sulphuric acid have been treated with ammonia to obtain mixed fertilisers, but it is found that more ammonia is absorbed than is retained when the product is exposed to the air. Ammonia is thus lost, and the composition of the fertiliser is uncertain. In this invention, saturated ammonia-phosphate fertiliser thus obtained is treated with air or waste flue gases to remove the loosely combined ammonia and the residual fertiliser is then stable. The ammonia may be used for the preparation of a further quantity of mixed fertiliser.

In an example, coal gas is freed from tar and is passed into an absorber 1 charged with superphosphate until free ammonia begins to be discharged. The gas passes through a second absorber 2 which removes any traces of ammonia. The gas is then diverted to absorber 2, and neutral flue gas is passed into absorber 1 to expel loosely combined ammonia, which is taken up by a third absorber 3, while any residual ammonia passing from the absorber 2 is recovered in absorber 4. When absorber 2 is saturated, the fresh gas is diverted to absorbers 4, 3, and the neutral flue gas is diverted to absorbers 2, 1, the latter containing a fresh charge of superphosphate. The process may thus be carried on in a continuous cycle. Two other arrangements of apparatus are described.

282,913. VAT DYES, MANUFACTURE OF. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, A. Shepherdson and S. Thornley, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, October 8, 1926.

It is found that the treatment of flavanthrone with hydroxylamine in the presence of sulphuric acid and subsequent acylation described in 282,852 above can also be applied to the synthesis of other new vat dyes by the similar treatment of pyranthrone or its derivatives. Examples are given of the production of a brown dyestuff from pyranthrone and its subsequent treatment with benzoyl caloride, acetic anhydride, acetyl chloride, oxalyl chloride, anisoyl chloride, etc.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—256,248 (Rohm and Haas Co.), relating to resinous condensation products of the urea-formaldehyde type, see Vol. XV, p. 356 ; 259,200 (Newport Co.), relating to prevention of solution of iron and steel in sulphuric acid, see Vol. XV, p. 548 ; 259,553 (Sharples Specialty Co.), relating to refining of petroleum, see Vol. XV, p. 595 ; 260,000 (I.G. Farbenindustrie Akt.-Ges.), relating to anthracene derivatives and benzanthrene, see Vol. XV, p. 621 ; 266,689 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab), relating to purification of gases for ammonia synthesis, see Vol. XVI, p. 449 ; 266,732 (Soc. Italiana Pirelli), relating to vulcanisation of rubber, see Vol. XVI, p. 486 ; 270,308 (I.G. Farbenindustrie Akt.-Ges.), relating to mordant dyestuffs, see Vol. XVII, p. 39 ; 275,945 (I.G. Farbenindustrie Akt.-Ges), relating to anhydrous metal chlorides, see Vol. XVII, p. 353.

International Specifications not yet Accepted

281,232. ORGANIC PHOSPHORUS COMPOUNDS. H. T. Böhme Akt.-Ges., 29, Moritzstrasse, Chemnitz, Saxony, Germany. International Convention date, November 25, 1926.

Fats and oils are treated with phosphoric anhydride, or acetyl phosphoric acid, or mixtures of acetic anhydride or acetyl chloride and orthophosphoric acid to obtain phosphoric esters which can be used as wetting or solvent agents or as substitutes for turkey red oils, or as pharmaceutical preparations. The treatment of ricinoleic and oleic acids is described.

281,257. HYDROGENATED ORGANIC COMPOUNDS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 25, 1926.

Naphthostyril or a homologue or substitution product is hydrogenated under pressure in presence of a solvent and a catalyst such as nickel, to obtain tetrahydro-naphtho-styril, its homologues and substitution products, which are useful as dyestuff intermediates or pharmaceutical compounds.

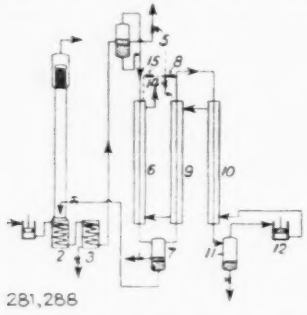
281,281. DYES. F. Bensa, 25, Piazza Fontane Marose, Genoa, Italy. (Assignee of A. Zinke, 30, Castellfeldgasse, Graz, Austria.) International Convention date, November 26, 1926.

Dry chlorine is passed into a solution or suspension of perylene or a low-chlorinated perylene in nitrobenzene in the presence of aluminium or antimony chloride to obtain highly chlorinated perylenes. These are treated with fuming sulphuric acid at 130°—180° C. to obtain chloroperylene quinones. An example is given of the treatment of dodecachloroperylene to obtain a vat dyestuff dyeing cotton red which turns olive-green on exposure to air.

281,288. SEPARATING AMMONIA FROM GASES. Ges. für Linde's Eismaschinen Akt.-Ges., Hallriegelskreuth, near Munich, Germany. International Convention date, November 27, 1926.

Tar, etc., is removed from coke oven gases, which are then compressed to 4 atmospheres and passed at 140° C. through coils in column 2 and water cooler 3, the temperature falling

to 50° C. Liquid naphthalene is discharged through valve 5, and dilute ammonia liquor passes into the gas entering a parallel flow washer 6. A 10 per cent. ammonia solution collects in a separator 7, and the gas passes into a counter



281,288

current washer 9, fed with a small quantity of water. Residual ammonia is removed, and the gas at 2° C. is cooled to —20° C. in a cooler 10, to remove benzol. The gas passes to an expansion cylinder 12, and then at —60° C. through the coolers 10, 9, 6, leaving the latter at 40°—50° C.

281,290. ARYLTHIOGLYCOLLIC ACIDS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 24, 1926.

Halogen-alkyl-benzenes, *e.g.*, trisubstituted benzines containing two halogen atoms and one alkyl group, are treated with chlorsulphonic acid at a temperature below 100° C. to obtain sulphochlorides, the sulphochloride group entering in the *p*-position to a halogen atom. These may be reduced to corresponding mercaptans which yield thioglycollic acids on condensation with chloracetic acid. Thus, *m*-chlortoluene yields 1-methyl-5-chlorbenzene-2-sulphochloride, -2-mercaptan, and -2-thioglycollic acid.

281,298. CYCLIC HYDROCARBONS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 24, 1926.

Aliphatic or hydroaromatic hydrocarbons are treated with an excess of hydrogen at 10-200 atmospheres and 500°—1,000° C. in a circular course. Gaseous hydrocarbons are removed continuously and cyclic hydrocarbons such as benzene, naphthalene, anthracene, and phenanthrene are obtained. Catalysts, such as chromium or its alloys, or manganese oxide may be present, but iron or nickel which favour the production of carbon and methane should be absent. The initial materials may be hydrogenation products of carbonaceous materials and may be in the nature of middle oils, which are treated as vapour or finely divided liquid. Several examples are given.

281,307. CATALYTIC AGENTS: OXYGENATED AND DEHYDROGENATED COMPOUNDS. Selden Co., 339, 2nd Avenue, Pittsburg, U.S.A. (Assignees of A. O. Jaeger, 25, Grandview Avenue, Crafton, Pittsburg, U.S.A.) International Convention date, November 26, 1926.

Oxidation or dehydrogenation catalysts comprise a zeolite obtained by the reaction of a silicate with one or more metallates or one or more metal salts. The active element in the contact mass is chemically combined in the zeolite molecule in one or more of four ways, which are described in detail, together with examples of the production of the catalysts. These have a wide application, such as the production of anthraquinone from anthracene and air, maleic and fumaric acids from air and benzene, toluene, phenol, the oxidation of *o*-, and *p*-chlor- and brom-toluenes, etc., formaldehyde from methyl alcohol, etc.

281,611. CYANAMIDES. N. Caro, 8, Budapesterstrasse, Berlin, and A. R. Frank, 138, Kurfurstendamm, Halensee, Berlin. (Assignees of Stickstoffwerke Ges., 4, Schadowsstrasse, Berlin.) International Convention date, December 2, 1926. Addition to 279,812. (See THE CHEMICAL AGE, Vol. XVII, p. 623.)

Oxides, formates, or carbonates of alkaline earth metals and magnesium are treated with gaseous mixtures such as ammonia and carbon monoxide which tend to form hydrocyanic acid, at a temperature of 400°—850° C. and at ordinary or increased pressure. Cyanamides are formed, the formation being facilitated by the presence of water. The presence of iron is avoided, and sulphur-containing gases or solid materials may be present to poison any metals which might act as decom position catalysts.

281,616. PRESERVING RUBBER. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of J. Teppema, 29, Mayfield Apartment, Twin Oaks, Akron, Ohio, U.S.A.) International Convention date, November 30, 1926.

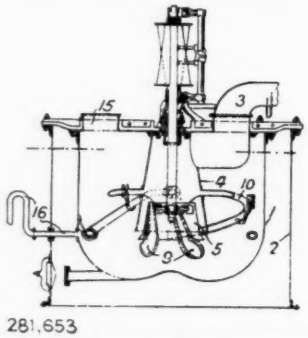
The ageing qualities of rubber compositions are improved by the addition of phenyl β-naphthylamine, phenyl-α-naphthylamine, α-β-dinaphthylamine, β-β-dinaphthylamine, diamino-diphenyl-di-β-naphthyl-methane. Phenyl-naphthylamine is made by heating naphthol, aniline, and fused calcium chloride to 280° C. and the manufacture of the other substances mentioned is also described.

281,650. CHLOROPYRIDINE. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, 7, Weissfrauenstrasse, Frankfort-on-Main, Germany. International Convention date, December 3, 1926.

2-Chloropyridine is obtained by treating N-alkyl-2-pyridones with phosgene.

281,653. TAR SEPARATORS. Soc. Anon. La Carbonite, 6, Avenue St. Remy, St. Denis-sur-Seine, France. (Assignees of H. Hennebutte, 62, Rue de Maubeuge, Paris, and E Goutal, 60, Boulevard St. Michel, Paris. International Convention date, December 2, 1926.

Hot gases from the distillation of wood, peat, lignite, etc., pass through a conduit 3 into a truncated cone 4 at the bottom



281,653

of which a second cone 5 having stirrer blades 9 is rotatably mounted. The gases and condensate are thereby thoroughly mixed and curved tubes 10 return liquid from the vessel 1 to the cone 4. Uncondensed gas passes off at 15, and tar at 16.

281,662. SOLIDIFIED SPIRIT. H. Ohle, and J. Othmar-Neuscheller, 64, Hasenheide, Berlin. International Convention date, November 30, 1926.

Ethyl alcohol is obtained in gel form by adding an alkali or alkaline earth salt of the sulphuric acid half esters of acetone derivatives of sugars and polyvalent alcohols such as diacetone-glucose, diacetone-galactose, α- and β-diacetone-fructose and acetone-glycerine. 1 or 2 per cent. of the potassium salt of α-diacetone fructose sulphuric acid is sufficient. The added substances are colourless, tasteless, and non-toxic.

LATEST NOTIFICATIONS.

284,199. Process for the preparation of alkyl ethers of protocatechnic aldehyde. Boedecker, Dr. F. January 24, 1927.

283,868. Containers for hydrofluoric acid and other highly corrosive chemicals and materials for the manufacture thereof. Traun, H. O. January 18, 1927.

283,913. Preparation of tetra alkyl lead. Daudt, H. W. January 20, 1927.

283,918. Centrifugal separators. Laughlin Filter Corporation. January 20, 1927.

284,206. Production of sulphonated oils and fats with a high content of organically combined sulphuric acid. Flesch, H. January 24, 1927.

284,208. Manufacture of sulphuric acid. Soc. Generale Metallurgique de Hoboken. January 24, 1927.

283,949. Process for the production of aluminium by fusion electrolysis. I.G. Farbenindustrie Akt.-Ges. January 21, 1927.

283,952. Manufacture of ampoules. I.G. Farbenindustrie Akt.-Ges. January 22, 1927.

283,887. Catalytic apparatus. Selden Co. January 19, 1927.

283,897. Manufacture of azo-dyestuffs. I.G. Farbenindustrie Akt.-Ges. January 19, 1927.

283,877. Process of halogenating organic compounds. I.G Farbenindustrie Akt.-Ges. January 18, 1927.

283,964. Manufacture of acid-proof linings for vessels. I.G. Farbenindustrie Akt.-Ges. January 22, 1927.

283,965. Manufacture of artificial materials. Soc. of Chemical Industry in Basle. January 21, 1927.

283,968. Manufacture of activated carbon. Berl, Dr. E. January 21, 1927.

284,224. Process for producing liquid hydrocarbons. Hansen, F. J. M. January 24, 1927.

Specifications Accepted with Date of Application

259,970. Azo dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. October 14, 1925.

260,998 and 280,217. Dyestuffs of the anthanthrone series, Manufacture of. L. Cassella and Co., Ges. November 7, 1925, and November 2, 1926. 280,217, addition to 260,998.

262,405. Purification of alumina. Aluminium Co. of America. December 4, 1925. Addition to 248,360.

265,232 and 265,964. Vat dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. January 29 and February 9, 1926. Additions to 237,294. 265,964, also addition to 265,232.

269,166. Catalytic production of hydrocyanic acid from formamide. I. G. Farbenindustrie Akt.-Ges. April 10, 1926.

269,927. Distillation of pyroligneous acid. Soc. des Produits Chimiques de Clamecy. April 22, 1926.

271,085. Titanium compounds, Manufacture of. Titan Co. Aktieselskabet. May 12, 1926.

276,017. Recovery of copper from liquors by precipitation. I. G. Farbenindustrie Akt.-Ges. August 14, 1926.

278,747. Zinc salts, Process of producing. Metallbank und Metallurgische Ges. Akt.-Ges. October 7, 1926.

279,037. Nitrate of lime, Production of. Appareils et Evaporateurs Kestner. October 16, 1926.

279,786. Solutions containing titanium, iron, and other compounds, Process in the reduction of. Titan Co. Aktieselskabet. October 28, 1926.

283,600. Catalytic decomposition of cyclic compounds. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*) July 12, 1926.

283,639. Distillation of oils from oil shale or coal or similar materials, Method of and apparatus for. R. H. Crozier. October 13, 1926.

283,661. Vulcanisation of rubber and rubber compounds, Method of producing an accelerator for. L. S. Sebrell. October 26, 1926.

283,679. Vulcanisation of rubber, Process of manufacturing an accelerator for. W. J. Kelly. November 9, 1926.

283,701. Absolute alcohol, Process for producing. E. C. R. Marks. (*U.S. Industrial Alcohol Co.*) November 29, 1926.

283,702. Lower aliphatic acids, Treatment of. British Celanese, Ltd., H. Dreyfus, and C. I. Haney. November 30, 1926.

283,717. Carbonaceous material, Treatment of. R. V. Farnham. December 18, 1926.

283,760. Aluminium alloys. J. Stone and Co., Ltd., and H. J. Maybrey. February 26, 1927.

283,771-2. Alkali metal nitrates, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*) April 25 and 29, 1927.

283,781. Acetic anhydride, Process for the production of. C. Ruzicka. May 27, 1927.

283,822. 2-phenylquinoline-4-carboxylic acid, Process for the manufacture of. A. J. Stephens. (*R. von Wulfing.*) September 23, 1927.

Applications for Patents

Baddiley, J., British Dyestuffs Corporation, Ltd., Hailwood, A. J., and Shepherdson, A. Dyestuff preparations. 2,590. January 26. (July 22, 1927.)

Balaban, I. E. and May and Baker. Manufacture of hydroxy aminophenyl arsinic acid. 2,331. January 24.

Barrett Co. Distillation of tar. 2,839. January 28. (United States, February 5, 1927.)

Bedrich, J. Apparatus for dyeing textile materials. 2,186. January 23.

Boehringer, A. Manufacture of dihydromorphine. 2,759. January 28. (Germany, February 15, 1927.)

British Celanese, Ltd., Green, S. J., and Widdowson, R. R. Manufacture of aliphatic compounds. 2,779, 2,780, 2,781. January 28.

Carpmael, A. and I. G. Farbenindustrie Akt.-Ges. Manufacture of condensation products of anthraquinone series. 2,348. January 24.

Carpmael, A. and I. G. Farbenindustrie Akt.-Ges. Manufacture of cotton dyestuffs. 2,349. January 24.

Carpmael, A. and I. G. Farbenindustrie Akt.-Ges. Manufacture of condensation products from fatty acids. 2,808. January 28.

Carpmael, A. and I. G. Farbenindustrie Akt.-Ges. Manufacture of condensation products from hydroxybenzenes, etc. 2,809. January 28.

Carroll, H. Conversion of heavy hydrocarbons. 2,782. January 28. (France, January 28, 1927.)

Chemical Engineering and Wilton's Patent Furnace Co., Ltd., Wilton, N., and Wilton, T. O. Apparatus for chemical treatment, etc. 2,844. January 28.

Dreyfus, H. Manufacture of textile materials. 2,174. January 23.

Dreyfus, H. Manufacture of artificial filaments, etc. 2,175. January 23.

Dreyfus, H. Manufacture of aliphatic compounds. 2,776, 2,777, 2,778. January 28.

Fawcett, H. W. Centrifugal separators. 2,741. January 27.

Girsewald, Conway, Baron Von., Metallbank und Metallurgische Ges. Akt.-Ges. Producing aluminium oxide from aluminium sulphide, etc. 2,743. January 27.

Grace, C. J. Producing an emulsion of sulphur in water, etc. 2,407. January 25.

Hirst, H. S. and Imperial Chemical Industries, Ltd. Production of acetaldehyde. 2,366. January 25.

(I.G. Farbenindustrie Akt.-Ges.), Johnson, J. Y. Production of raw rubber jellies. 2,125. January 23.

(I.G. Farbenindustrie Akt.-Ges.), Johnson, J. Y. Production of chromiferous dyestuffs. 2,126. January 23.

(I.G. Farbenindustrie Akt.-Ges.), Johnson, J. Y. Separation of oils from mixtures with solid substances. 2,127. January 23.

(I.G. Farbenindustrie Akt.-Ges.), Johnson, J. Y. Production of organic oxygen compounds. 2,218. January 23.

(I.G. Farbenindustrie Akt.-Ges.), Imray, O. Y. Manufacture of homogeneous 2:3- and 2:5-dechloro-4-amino-1-methylbenzene. 2,291. January 24.

I.G. Farbenindustrie Akt.-Ges. Production of mono-carboxylic acids. 2,124. January 23. (November 22, 1926.)

I.G. Farbenindustrie Akt.-Ges. Production of section bars of irregular thickness. 2,208. January 23. (Germany, February 9, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of derivatives of anthraquinone series. 2,347. January 24. (Germany, January 25, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of acid-proof linings for vessels. 2,425. January 25. (Germany, May 9, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 2,426. January 25. (Germany, January 27, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs. 2,456. January 25. (Germany, January 25, 1927.)

I.G. Farbenindustrie Akt.-Ges. Treatment of rubber latex. 2,686. January 27.

I.G. Farbenindustrie Akt.-Ges. Manufacture of 6-alkloxy-8-aminoquinolines. 2,718. January 27.

I.G. Farbenindustrie Akt.-Ges. Manufacture of cellulose esters. 2,733. January 27. (Germany, January 27, 1927.)

I.G. Farbenindustrie Akt.-Ges. Production of phosphorus etc. 2,742. January 27. (Germany, February 10, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of accumulator plates. 2,814. January 28. (Germany, January 28, 1927.)

Imperial Chemical Industries, Ltd. Processes for pickling metals. 2,710. January 27.

Imperial Chemical Industries, Ltd. and Watts, H. G. Hydrogenation of carbonaceous materials. 2,758. January 26.

Leonyte, Ltd. and Lewinson, A. Synthetic resins. 2,823. January 28.

Meissner, J. and Schmid, A. Nitrating glycerine, etc. 2,826. January 28. (Germany, February 5, 1927.)

Meissner, J. and Schmid, A. Treating nitroglycerine, etc. 2,827. 2,828. January 28. (Germany, February 5, 1927.)

Meissner, J. and Schmid, A. Treating nitroglycerine, etc. 2,829. January 28. (Germany, October 25, 1927.)

Metallbank und Metallurgische Ges. Akt.-Ges. Means for suspension of masses. 2,837. January 28. (Germany, February 21, 1927.)

Riedel Akt.-Ges., J. D. Production of aromatic aldehydes. 2,544. January 26. (Germany, May 20, 1927.)

Schulemann, W. and Wingler, A. Manufacture of 6-alkoxy-8-aminoquinolines. 2,718. January 27.

Scottish Dyes, Ltd. and Wylam, B. Esterification of cellulose materials. 2,579. January 26.

Selden Co. Contact sulphuric acid process. 2,141. January 23. (United States, August 3, 1927.)

Selden Co. Contact sulphuric acid process. 2,802. January 28. (United States, March 10, 1927.)

Walter, G. Manufacture of methylol ureas. 2,601. January 26. (Austria, November 28, 1925.)

Wilhelm, K. F. Removal of fatty acids, etc. from oils, etc. 2,255. January 24. (Germany, May 2, 1927.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages extra.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 2d. to 2s. 7d. per gall.; pyridinised industrial, 2s. 4d. to 2s. 9d. per gall.; mineralised, 3s. 3d. to 3s. 7d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity as from January 1, 1928.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 7¾d. per lb. Crude 60's, 2s. 3½d. to 2s. 5d. per gall. prompt; lower for forward delivery.

ACID CRESYLIC 99/100.—2s. 11d. to 3s. per gall. 97/99.— 2s. 7d. to 2s. 10d. per gall. Pale, 95%, 2s. 3d. to 2s. 6d. per gall. Dark, 95%, 2s. 1d. to 2s. 3d.

ANTHRACENE.—A quality, 2½d. per unit. 40%, £5 per ton.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7¾d. to 8d. per gall.

BENZOLE.—Crude 65's, 9¼d. to 9¾d. per gall., ex works in tank wagons. Standard Motor, 1s. 1½d. to 1s. 2½d. per gall., ex works in tank wagons. Pure, 1s. 5d. to 1s. 6d. per gall., ex works in tank wagons.

TOLUOLE.—90%, 1s. 4d. to 1s. 8d. per gall. Firm. Pure, 1s. 6d. to 1s. 11d. per gall.

XYLOL.—1s. 3d. to 1s. 8d. per gall. Pure, 1s. 9d. per gall.

CREOSOTE.—Cresylic, 20/24%, 10d. to 11d. per gall.; middle oil, 8d to 9d. per gall. Heavy, 8¾d. to 9d. per gall. Standard specification, 7¾d. to 7¾d. ex works. Salty, 7d. per gall., less 1½%.

NAPHTHA.—Crude, 9d. to 10d. per gall. Solvent 90/160, 1s. to 1s. 1d. per gall. Solvent 95/160, 1s. 3d. to 1s. 4d. per gall. Solvent 90/190, 10d. to 1s. 2d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed or hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £13 to £13 10s. per ton. Quiet. Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 67s. 6d. to 85s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 5s. 6d. to 6s. 6d. per gall. 90/180, 3s. 6d. to 5s. per gall. Heavy, 3s. to 3s. 6d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 5d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 5d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8½d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8½d. per lb.

p-TOLUIDINE.—2s. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £10 5s. per ton. Good demand. Grey, £14 10s. to £15 per ton. Liquor, 9d. per gall.

CHARCOAL.—£6 to £9 per ton, according to grade and locality. Foreign competition severe.

IRON LIQUOR.—1s. 3d. per gall, 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10d. per gall.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 11d. to 4s. 3d. per gall. Solvent, 4s. 3d. per gall.

WOOD TAR.—£4 to £5 per ton.

BROWN SUGAR OF LEAD.—£40 15s. per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 5½d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 6d. to 2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 1d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPHONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. to 6s. 3d. per lb.

ZINC SULPHIDE.—1s. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 5d. to 2s. 6d. per lb.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. to 1s. 3d. per oz., according to quantity.
ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 8d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.
ACID, SALICYLIC, B.P. PULV.—1s. 2d. to 1s. 3d. per lb.; Technical.—11½d. to 11¾d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 3¼d. per lb., less 5%.
ACETANILIDE.—1s. 6d. to 1s. 9d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—8s. to 8s. 3d. per lb.
AMMONIUM BENZOATE.—3s. to 3s. 3d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—10s. 4d. to 10s. 7d. per lb.
BISMUTH CITRATE.—9s. 10d. to 10s. 1d. per lb.
BISMUTH SALICYLATE.—8s. 10d. to 10s. 1d. per lb.
BISMUTH SUBNITRATE.—8s. 4d. to 8s. 7d. per lb.
BISMUTH NITRATE.—6s. 1d. to 6s. 4d. per lb.
BISMUTH OXIDE.—13s. 10d. to 14s. 1d. per lb.
BISMUTH SUBCHLORIDE.—13s. 10d. to 14s. 1d. per lb.
BISMUTH SUBGALLATE.—8s. 1d. to 8s. 4d. per lb. Extra and reduced prices for smaller and larger quantities respectively; Liquor Bismuthi et Ammon, Cit. B.P. in W. Qts. 1s. 1d. per lb.; 12 W. Qts. 1s. per lb.; 36 W. Qts., 11½d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 1s. 11½d. to 2s. per lb.; potassium, 1s. 8½d. to 1s. 8¾d. per lb.; sodium, 1s. 10½d. to 1s. 11d. per lb.; granulated ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—1s. 2½d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. 1d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. '730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE.—£39 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—4s. 9d. to 5s. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 10d. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE.—B.P., 2s. 3d. to 2s. 6d. per lb. Green, 2s. 6d. to 2s. 11d. per lb.; U.S.P., 2s. 4d. to 2s. 7d. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb., in 1 cwt. lots.
MENTHOL.—A.B.R. recrystallised B.P., 16s. 6d. per lb. net for January delivery; Synthetic, 9s. to 10s. per lb.; Synthetic detached crystals, 9s. to 12s. 6d. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, 7s. 6d. to 7s. 7d. per lb., levig., 7s. to 7s. 1d. per lb.; Corrosive Sublimate, Lump, 5s. 9d. to 5s. 10d. per lb., Powder, 5s. 2d. to 5s. 3d. per lb.; White Precipitate, Lump, 5s. 11d. to 6s. per lb., Powder, 6s. to 6s. 1d. per lb., Extra Fine, 6s. 1d. to 6s. 2d. per lb.; Calomel, 6s. 4d. to 6s. 5d. per lb.; Yellow Oxide, 6s. 10d. to 6s. 11d. per lb.; Persulph., B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 5s. 10s. to 5s. 11d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 5d. to 1s. 9d. per lb.
METHYL SULPHONAL.—9s. to 9s. 3d. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 1d. to 1s. 4d. per lb.
PHENACETIN.—2s. 6d. to 2s. 9d. per lb.
PHENAZONE.—4s. to 4s. 3d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—94s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 1911, 1s. 8d. to 1s. 11d. per lb.; U.S.P., 2s. 1d. to 2s. 4d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 5d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—55s. per lb.; in quantity lower.
SALOL.—2s. 4d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 10d. to 2s. 1d. per lb., B.P.C., 1923—2s. 3d. to 2s. 4d. per lb. for 1-cwt. lots. U.S.P., 2s. 1d. to 2s. 3d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—90s. to 95s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 7d. to 1s. 9d. per lb. Crystal, 1s. 8d. to 1s. 10d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—6s. 9d. to 7s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 10s. to 10s. 3d. per lb., according to quantity. Firmer. Natural, 14s. 3d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—10s. per lb.
CITRONELLOL.—13s. 6d. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—8s. 3d. per lb.
GERANIOL (PALMAROSA).—17s. 9d. per lb.
GERANIOL.—6s. to 10s. per lb.
HELIOTROPINE.—4s. 6d. per lb.
ISO EUGENOL.—13s. per lb.
LINALOL.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 10s. 6d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 18s. 6d. per lb. Ex Shui Oil, 14s. 6d. per lb.
METHYL ANTHRANILATE.—8s. 6d. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—35s. per lb.
MUSK XYLOL.—8s. per lb.
NEROLIN.—4s. 6d. per lb.
PHENYL ETHYL ACETATE.—11s. 6d. per lb.
PHENYL ETHYL ALCOHOL.—10s. 6d. per lb.
RHODINOL.—32s. 6d. per lb.
SAFROL.—1s. 6d. per lb.
TERPINEOL.—1s. 8d. per lb.
VANILLIN.—15s. 3d. to 16s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—26s. per lb.
BOURBON GERANIUM OIL.—14s. per lb.
CAMPHOR OIL.—9d. per lb.
CANANGA OIL, JAVA.—14s. 6d. per lb.
CINNAMON OIL LEAF.—6s. 9d. per lb.
CASSIA OIL, 80/85%.—6s. 9d. per lb.
CITRONELLA OIL.—Java, 2s. per lb., c.i.f. U.K. port. Ceylon, pure, 1s. 9d. per lb.
CLOVE OIL.—5s. 6d. per lb.
EUCALYPTUS OIL, AUSTRALIAN.—2s. 1d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, Esters, 17s. per lb.
LEMON OIL.—9s. per lb.
LEMONGRASS OIL.—4s. 3d. per lb.
ORANGE OIL, SWEET.—12s. 6d. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 65s. per oz.
PALMA ROSA OIL.—11s. per lb. nominal.
PEPPERMINT OIL.—Wayne County, 16s. per lb.; Japanese, 7s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, February 1, 1928.

BUSINESS in the chemical market this week has continued on a moderate basis with very few price changes. Prices on the whole are firm with an upward tendency. Export trade is satisfactory.

General Chemicals

ACETONE is extremely firm at £64 to £66 per ton, according to quantity and position.

ACID ACETIC is unchanged at £37 to £38 per ton, for standard 80% grade, with an active demand.

ACID CITRIC is extremely firm at 1s. 7½d. per lb., with a good inquiry.

ACID FORMIC is unchanged at £45 to £47 per ton, according to quantity.

ACID LACTIC meets with a firm demand at £43 per ton, for 50% by weight.

ACID TARTARIC continues firm at 1s. 3d. to 1s. 3¼d. per lb.

ALUMINA SULPHATE continues firm and in good demand at £5 15s. to £5 17s. 6d. per ton.

AMMONIUM CHLORIDE is unchanged.

BARIUM CHLORIDE is steady at £8 to £9 per ton, according to quantity and position with an upward tendency.

COPPER SULPHATE is extremely firm with a good demand in the field, the market may be taken at £24 10s. per ton.

CREAM OF TARTAR continues very firm and price is well maintained at round about £95 per ton.

EPSOM SALTS is unchanged.

FORMALDEHYDE.—Requisitions of this article are increasing and the price continues very firm at £41 to £43 per ton, according to quantity.

LEAD ACETATE.—The demand continues active with the price firm at £42 per ton for white, and £1 per ton cheaper for brown.

LIME ACETATE is unchanged.

METHYL ACETONE is in good demand at £55 per ton.

POTASSIUM CHLORATE is firmer at £29 per ton, and supplies for prompt delivery remain very short.

POTASSIUM PERMANGANATE.—The demand is slowly improving at about 5d. to 5¼d. per lb. for B.P. quality.

POTASSIUM PRUSSIATE is unchanged on the basis of £58 to £60 per ton, according to quantity and position, demand is fair.

SODIUM ACETATE continues short and price is advancing.

SODIUM BICHROMATE is unchanged at British makers' figures.

SODIUM CHLORATE continues in short supply and price is firm at £26 10s. to £28 10s. per ton.

SODIUM NITRITE is firmer at £19 15s. to £20 10s. per ton, with a fair demand.

SODIUM PRUSSIATE is unchanged at 4¼d. to 5d. per lb., according to quantity.

Coal Tar Products

The market for coal tar products is quiet, and there is little change in prices to report from last week.

90's BENZOL is unchanged, at about 1s. 3d. to 1s. 4d. per gallon, while the motor quality is quoted at 1s. 1d. to 1s. 2d. per gallon.

PURE BENZOL is worth about 1s. 5½d. to 1s. 6½d. per gallon, on rails.

CREOSOTE OIL remains firm, at about 7½d. per gallon, on rails, in the North, while the price in London is about 8½d. per gallon.

CRESYLIC ACID is unchanged from last week, the pale quality, 97/99%, being quoted at 2s. 5d. per gallon, on rails, while the dark quality, 95/97%, is worth about 2s. per gallon.

SOLVENT NAPHTHA is very weak, and can be bought in the provinces at 8d. per gallon.

HEAVY NAPHTHA is quoted at about 10d. per gallon, on rails.

NAPHTHALENES remain rather scarce, the 74/76 quality being quoted at about £7 per ton, while the 76/78 quality is quoted at £8 to £8 10s. per ton.

PITCH is weak, nominal price is about 70s., f.o.b. U.K. ports.

Latest Oil Prices

LONDON, February 1.—LINSEED OIL steady at 2s. 6d. per ton decline. Spot, ex mill, £28 5s.; February, £27 7s. 6d.; March-April, £27 17s. 6d.; May-August, £28 15s.; and September-December, £29 7s. 6d. RAPE OIL quiet. Crude, extracted, £43; technical refined, £45, naked, ex wharf. COTTON OIL slow. Refined common edible, £41; Egyptian crude, £36; and deodorised, £43 per ton. TURPENTINE dull, and 1s. to 9d. per cwt. lower. American, spot, 41s. 3d.; March-April, 42s.; May-June, 42s. 6d.; and July-December, 43s. 3d. per cwt.

HULL, February 1.—LINSEED OIL.—Naked, spot and February, £28; March-April, £28 2s. 6d.; May-August, £28 10s.; September-December, £29 10s. per ton, naked. COTTON OIL.—Naked, Bombay crude, £31 15s.; Egyptian crude (new), £34; edible refined, £38; technical, £35 5s.; deodorised, £40 per ton, naked. PALM KERNEL OIL.—Crushed 5½ per cent., £38 10s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot and deodorised, £44. SOYA OIL.—Extracted and crushed, £33; deodorised, £36 10s. RAPE OIL.—Crude/extracted, £41; refined, £43 per ton. TURPENTINE, CASTOR, and COD OIL unaltered.

Nitrogen Products

Export.—During the past week the demand for sulphate of ammonia has been quiet, but in view of the expectant spring demand prices have remained firm at £9 15s. per ton, f.o.b. U.K. port in single bags.

Home.—Each week finds increased demand as merchants are commencing to cover their spring requirements. The increase is particularly noticeable in the South of England.

Nitrate of Soda.—The market remains unchanged, with demand slow but prices steady.

South Wales By-Products

South Wales by-product activities continue on the quiet side, with the inquiry moderate. Pitch remains weak and only small sales, principally to briquette manufacturers, have been made. The market is reflected in the price, which now ranges from 77s. 6d. to 80s. per ton, delivered. Refined tar anticipations look like materialising and strong demands are expected about the middle of February. Prices are unchanged at present, coke oven tar changing hands at 8½d. to 9d. per gallon, and gasworks' tar at from 7¾d. to 8½d. per gallon, f.o.r. maker's works, and from 10d. to 1s. per gallon, delivered in barrels. Heavy and solvent naphtha continue weak, but a stronger tendency is evident in solvent, at prices ranging from 10d. to 1s. 1d. per gallon. Crude tar continues in poor demand with values unchanged. Patent fuel and coke exports remain moderate, but, on the whole, satisfactory. Patent fuel for export remains steady at from 23s. to 24s. per ton, while coke for export ranges from 27s. 6d. to 37s.

Petrol Ships in the Thames

THE London County Council's case against the Port of London Authority's new by-laws permitting petrol-laden ships to proceed up the Thames to Purfleet was this week continued at the Ministry of Transport Inquiry at the Port Authority's offices, Tower Hill. Dr. W. R. Hodgkinson, vice-president of the Society of Chemical Industry and formerly professor at the Artillery College, Woolwich, giving evidence on Wednesday, said that early in the War he conducted experiments in regard to the rate of spread of petrol on water. In a running stream the tendency was for the petrol to keep to the middle of the current. The petrol appeared to move more quickly when it lighted. Replying to a question, he stated that he thought there would be a frightful accident if the contents of two tanks of petrol containing 500 to 900 tons were spilled on the Thames through an accident to a tanker. Replying to Mr. H. P. Macmillan, K.C. (for the Port of London Authority), Dr. Hodgkinson explained his connection with the inquiry by saying that he wrote to Sir George Hume, of the L.C.C. Mr. Craig Henderson, K.C. (for the L.C.C.), explained that Dr. Hodgkinson was not there as a paid expert. He had come out of public interest to state what he knew about petrol.

New Film Substance that Will Not Burn

CINEMA film that will not burn has been put through strict independent tests at the works of Jury-Metro-Goldwyn, Ltd., who report that "its photographic quality is in every way equal to that obtained on the ordinary nitro-cellulose film." They assure the Non-Inflammable Film Co. that the new product survived most satisfactorily repeated runs on their own machines, followed by 180 screenings at a leading West-End cinema.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, February 1, 1928.

DURING the past week business in the heavy chemical market has been rather quieter but the volume of business placed in proportion to inquiry is still good. There are no changes of any importance in prices to record.

Industrial Chemicals

ACETONE, B.G.S.—£63 to £66 per ton, ex store, according to quantity.

ACID ACETIC.—98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powdered, £32 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—In moderate demand and quoted price unchanged at 7¼d. per lb., f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—In good demand and price advanced to about 1s. 8d. per lb., ex store, spot delivery.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80%.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer from the Continent at 3¼d. per lb., ex wharf. Spot material quoted 3½d. per lb., ex store. In better demand.

ACID SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality; £6 5s. per ton for 168° quality. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—In rather better demand and now quoted 1s. 2¾d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot material quoted £5 12s. 6d. per ton, ex store. On offer for early delivery at £5 5s. per ton, c.i.f. U.K. ports.

ALUM.—Lump potash quality, quoted £8 5s. per ton, c.i.f. U.K. ports. Crystal meal now offered at the same figure. Lump quality on spot quoted £9 per ton, ex store.

AMMONIA ANHYDROUS.—Unchanged at about 9d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £30 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture unchanged at £23 to £24 per ton, ex station. Continental on offer at £19 15s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £17 10s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £19 15s. per ton, ex wharf, prompt despatch from mines. Spot material on offer at about £20 15s. per ton, ex store.

BARIUM CARBONATE, 98/100%.—English material on offer at £7 5s. per ton, ex store. Continental quoted £7 per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £6 17s. 6d. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers, £6 12s. 6d. per ton, delivered, minimum 4-ton lots. Continental on offer at £6 10s. per ton, ex wharf.

BORAX.—English manufacturers' price unchanged as follows:—Granulated, £19 10s. per ton; crystals £20 per ton; powdered, £21 per ton. Odd parcels on offer of granulated from America at about £16 per ton, ex wharf.

CALCIUM CHLORIDE.—British manufacturers' price £4 15s. per ton, to £5 5s. per ton, ex station, according to quantity and point of delivery. Continental material, quoted £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports, for export.

COPPER SULPHATE.—Continental material now much higher. Quoted £25 10s. per ton, c.i.f. U.K. ports. British material on offer at about the same price, ex store.

FORMALDEHYDE, 40%.—On offer at £37 5s. per ton, c.i.f. U.K. ports. Spot material quoted £39 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store, or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material quoted £31 10s. per ton, ex store.

LEAD, WHITE.—On offer at £31 15s. per ton, ex store.

LEAD ACETATE.—White crystals quoted £39 15s. per ton, c.i.f. U.K. ports; brown, £38 10s. per ton, c.i.f. U.K. ports. Spot material on offer at £42 15s. per ton, ex store, spot delivery.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store in moderate demand.

POTASSIUM BICHROMATE.—4⅛d. per lb. delivered, minimum 4-ton lots. Under 4-ton lots, ⅛d. per lb. extra.

POTASSIUM CARBONATE, 96/98%.—Rather scarce for immediate delivery. Quoted £25 10s. per ton, ex wharf. Spot material about £26 10s. per ton, ex store.

POTASSIUM CHLORATE, 99/100%.—Powdered material offered from the Continent at £25 10s. per ton, c.i.f. U.K. ports. Crystals, 30s. per ton more.

POTASSIUM NITRATE.—Rather cheaper quotations from the Continent. Now quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Now quoted 6d. per lb., ex wharf. Prompt delivery.

POTASSIUM PRUSSIATE (YELLOW).—Unchanged at about 6½d. per lb., ex store, spot delivery. Offered from the Continent at 6⅜d. per lb.

SODA CAUSTIC.—Powdered, 98/99%, £17 17s. 6d. per ton; solid, 76/77%, £14 10s. per ton; 70/72, £13 12s. 6d. per ton, minimum 4-ton lots, carriage paid on contract. Spot material, 10s. per ton extra.

SODIUM ACETATE.—In good demand and spot material scarce. Quoted £20 5s. per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less. No change in price for this year.

SODIUM BICHROMATE.—Quoted 3d. per lb., delivered buyers' works, minimum 4-ton lots; under 4 and over 2-ton lots, 3 1/16d. per lb.; under 2-ton lots, 3¼d. per lb.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton extra.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots.

SODIUM NITRITE, 100%.—Quoted £19 10s. per ton, ex store.

SODIUM PRUSSIATE (YELLOW).—In moderate demand and price unchanged at about 4¼d. per lb., ex store. Offered for prompt shipment from the Continent at 4⅛d. per lb., ex wharf.

SODIUM SULPHATE (SALTCAKE).—Prices, 50s. per ton, ex works for unground quality, 52s. 6d. per ton, delivered. Ground quality, 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices now as follows:—solid, 60/62%, £9 per ton; broken, 60/62%, £10 per ton; crystals, 30/32%, £9 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material, 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 15s. per ton; rock, £10 12s. 6d. per ton; floristella, £9 10s. per ton; ground American, £9 5s. per ton; ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid, on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports. Powdered, 20s. per ton extra.

ZINC SULPHATE.—Continental material quoted £11 15s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Action over Pyridine Contract

ON Tuesday in the King's Bench Division, Mr. Justice Rowlatt heard an action by Etablissements Bergis-Sturm, of Paris, against B. Bretscher and Co., of King William Street, London, for damages for alleged breach of a contract of October, 1927, made between defendants and Arnault and Vandierdonck as plaintiffs' brokers or agents, to accept and pay for a quantity of pyridine. Plaintiffs said under the terms of the contract they agreed to sell and defendants to buy 2,000 to 2,500 kg. of pyridine heavy at 9.40 French francs per kg. f.o.b. Rouen. Defendants in breach of the contract failed and refused to take delivery of the goods, the plaintiffs had to resell and had suffered damage thereby. Defendants denied that there was any concluded contract, or that they had tried to get out of a bad bargain.

His lordship entered judgment for the plaintiffs for the agreed amount of damages, £88 with costs, holding that the defendants were liable as there had been no lapse of time which entitled the defendants to construe a refusal.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, February 2, 1928.

Although in certain sections business in chemical products on the Manchester market continues to hang fire a not unsatisfactory trade is being put through in most of the principle lines of "heavies," and in spite of the prevailing slackness in the cotton textile industry in this part of the country. The demand for chemicals on this centre on export account is, however, of limited extent, and with the Continent particularly, the movement is slow. With regard to values, these remain quite steady in most sections.

Heavy Chemicals

There is a moderate amount of buying interest being shown in chlorate of soda, with offers usually at about 3d. per lb., although slightly more than this figure is being quoted in some cases. Makers are offering caustic soda in contract lots at the reduced rates of £13 7s. 6d. to £15 7s. 6d. per ton, according to quality, and a quietly steady trade is going through. Bicarbonate of soda shows no alteration in the price situation, quotations keeping steady at round £10 10s. per ton, with inquiry maintained at about its recent level. Saltcake meets with a quiet demand on the basis of £2 12s. 6d. per ton in contract deliveries. There is still only a quiet trade passing in the case of hyposulphite of soda, but prices show little change on the week, the commercial grade being quoted at £9 10s. and the photographic at £16 to £16 5s. With regard to phosphate of soda sellers are asking up to about £12 15s. per ton, with the demand on moderate lines. Offers of bleaching powder are at round £7 per ton, a quietly steady call for this material being reported. Prussiate of soda has not been particularly active during the past week, but prices keep rather firm at about 4¼d. per lb. Sulphide of sodium is on the quiet side, but values are fairly steady at £10 to £10 5s. per ton for the 60–65 per cent. concentrated solid quality and about £8 10s. for the commercial. Alkali keeps up at round £6 2s. 6d. per ton and a fair business is going through. Nitrate of soda is steady and in moderate inquiry at round £19 2s. 6d. per ton.

There is only a quiet trade passing in permanganate of potash, but prices keep fairly steady at 5½d. per lb. for the B.P. and about 4⅞d. per lb. for the commercial. Offers of carbonate of potash are now on a rather lower basis, current value of this material being round £25 10s. per ton. Chlorate of potash this week has been a somewhat quiet section, with quotations ranging from 3d. to 3¼d. per lb. Bichromate of potash keeps steady at about 4¼d. per lb. and there is a fair demand about. Current values of yellow prussiate of potash are in the neighbourhood of 6½d. per lb., with inquiry on moderate lines. Caustic potash meets with a steady demand at £33 5s. per ton for prompt delivery of one to five-ton lots.

Continued slight easiness is to be noted in the case of arsenic; only a quiet demand is about just now and £17 15s. per ton at the mines for white powdered, Cornish makes, is about the top price to-day. Sulphate of copper is quoted at from £24 15s. to £25 per ton, f.o.b., and buying interest continues on fairly satisfactory lines. Acetate of lime is firm and in moderate demand at about £10 10s. per ton for brown quality and £16 15s. for grey. Nitrate of lead is dull and values easier again at £37 5s. per ton. Acetate of lead has not altered much but business is quiet; white is on offer at up to £41 per ton and brown at £39 to £39 10s.

Acids and Tar Products

Citric acid is rather scarce on spot delivery account and values are displaying increased firmness, from 1s. 7d. to 1s. 7¼d. per lb. being currently quoted. Tartaric acid is steady though in quiet demand at about 1s. 2⅞d. per lb. There is a moderate inquiry about for oxalic acid, with offers remaining at up to 3½d. per lb.

Pitch continues to move off slowly and prices are easy at from £3 7s. 6d. to £3 10s. per ton, f.o.b. There is little buying interest being shown in the case of solvent naphtha and values are weak at about 10¾d. per gallon. Creosote oil continues firm and in good inquiry, particularly for export, at up to 7¾d. per gallon. With regard to carbolic acid, crystals are quiet at about 7¼d. per lb., with the crude material steady and in rather short supply at 2s. 4d. per gallon.

Company News

Mond Nickel Co.—The board have declared an interim dividend of 7½ per cent on the ordinary shares in respect of the financial year ending April 30, 1928, payable on March 1, 1928.

Staveley Coal and Iron Co.—An interim dividend of 6d. per share has been declared on the fully paid shares, and 4½d. per share on the 15s. paid shares, being 5 per cent. per annum, free of tax.

Anton Jurgens' Vereenigde Fabrieken (Anton Jurgens' United (Margarine) Works).—In respect of the year ended December 31 last, final dividends of 3 per cent. have been declared on the preference issues.

Borax Consolidated.—The directors have decided to recommend the payment of a final dividend of 1s. per share (5 per cent.), less income tax at 4s. in the £, on the deferred ordinary shares, making with the interim dividend paid in November last, 7½ per cent. for the year ended September 30, 1927.

English Velvet and Cord Dyers' Association.—The report for the year ended December 31, 1927, states that profits, including interest, dividends, and transfer fees received, and after making provision for income-tax, amount to £79,417, from which must be deducted depreciation provided for year £19,651, and interest on debentures for year £8,379, leaving a net profit of £51,387. After adding profit on investments realised £9,485, and net balance brought forward of £14,808, there is a total of £75,682. The directors recommend a final dividend of 10 per cent. per annum on the ordinary shares (making, with interim dividend, 7 per cent. for year), placing to reserve fund £10,000, to fund for benefit of employees £5,000, carrying forward £19,629.

Major and Co.—The directors recommend that the authorised capital be reduced from £450,000 to £326,000 by cancelling 10s. per share on each of the 155,000 issued 8 per cent. participating preferred ordinary shares and 15s. per share on each of the 62,000 issued ordinary shares. The capital will again be increased to £450,000 by the creation of 124,000 new shares of £1. Each of the 45,000 unissued 8 per cent. (cumulative as to 7 per cent.) participating preferred ordinary shares of £1 will be divided into two shares of 10s., and each of the 38,000 unissued ordinary shares of £1 will be divided into four shares of 5s. All arrears of preferential dividend in respect of the 8½ per cent. preference and the 8 per cent. participating preferred down to March 31, 1928, will be cancelled, and such shares shall henceforth be respectively know as 7½ per cent. cumulative preference shares and 8 per cent. preferred ordinary shares. Profits available in each year as from April 1, 1928, will be applied:—First, in payment of a fixed preferential dividend of 6 per cent. on the 6 per cent. preference; secondly, in payment of a fixed preferential dividend of 7½ per cent. on the 7½ per cent. preference; thirdly, in setting aside to reserve such sum as the directors shall think proper; and fourthly, in payment of a non-cumulative preferential dividend of 8 per cent. on the preferred ordinary shares. Any balance of profits will then be applied as to one half by way of further dividend upon the preferred ordinary, and as to the other half by way of dividend upon the ordinary shares.

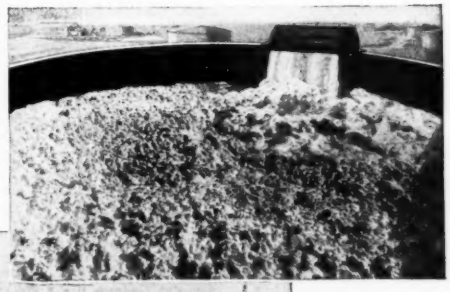
Nichols Medal for Professor H. S. Taylor

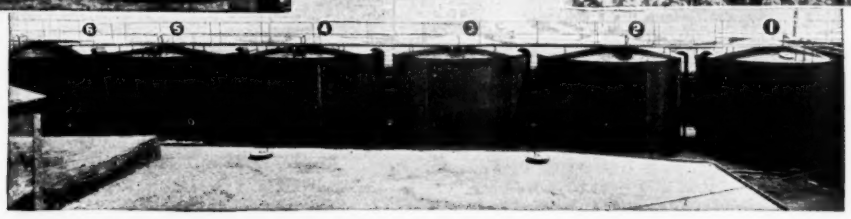
The award of the Nichols medal for 1928 to Professor S. Taylor, head of the department of chemistry at Princeton University, is announced by the New York Section of the American Chemical Society. The award is determined by "the research published during the current year which in the opinion of the jury, is most original and stimulative to further research." Professor Taylor, internationally known for his studies in catalysis, is the David B. Jones Research Professor of Chemistry in Princeton. He is English by birth and was educated at the University of Liverpool. He was called to Princeton from Germany (where he was working with Professor Bodenstein), early in 1914, as instructor in physical chemistry, and was made assistant professor in 1915. During the world war he was employed by the British Government in the Munitions Inventions Department, on problems relating to the fixation of atmospheric nitrogen.

Protecting moderate size oil storage tanks

The Foamite Generator System

The standards which form the basis for determining the efficiency of the various parts which go to make up the Foamite Generator System have been firmly established by long successful service records in actual working conditions.





IN the Foamite Generator System, Firefoam is produced with the Foamite Foam Generator by introducing Foamite Generator Powder into a stream of flowing water. The Generator is located at a distance from the burning tank, and the Firefoam is carried to the tank through fixed piping and is discharged on to the burning liquid from a discharge chamber that is fastened to the tank.

The operation of this system is simplicity itself. A hose connection is all that is needed from the water supply to the inlet side of the Generator, which is set up near the Generator Connection Stand. Another length of hose connects the outlet side of the Generator to the Generator connection leading to the burning tank. The Generator is then operated in the usual manner. Genuine Firefoam is thus discharged on to the surface of the burning oil in adequate quantity and at correct rate of flow through a discharge chamber similar to those used so successfully with the Foamite (Two Solution) Systems.

Full particulars of the Foamite Generator Installation, which dispenses with the large solution storage tanks, can be obtained from Foamite Firefoam Limited, 55–57 Great Marlborough Street, London, W.1.

Foamite Fire Protection

A Complete Engineering Service

Against Fire

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Deed of Arrangement

EVERS, William Watson, 8, Sandygate, Wath-upon-Dearne, chemical plumber and lead burner. (D.A., 4/2/28.) Dated January 27, filed January 28. Trustee, C. P. Tiptaft, 1, Cliff Street, Mexborough, C.A. Secured creditors, £500; liabilities unsecured, £635; assets, less secured claims, £471.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

BILLING (CHARLES) AND CO., LTD., London, W.C., soap manufacturers. (M., 4/2/28.) Registered January 20, £1,500 debenture, to A. J. Bennett, Kirklington Hall, Southwell, M.P.; general charge.

GILMONT PRODUCTS, LTD., London, E.C., manufacturers of dental cream. (M., 4/2/28.) Registered January 17, £1,000 debentures part of £25,000; general charge.

RAINES AND PORTER, LTD. (late RAINES, PORTER AND SEDDON, LTD.), Hull, oil refiners. (M., 4/2/28.) Registered January 19, £1,500 charge, to Miss C. E. Wheen and another, 12, Whitelow Road, Chorlton-cum-Hardy; charged on lands and premises in John Street and Randall Street, Sheffield. *£3,100. April 5, 1927.

RANSOM (WILLIAM) AND SON, LTD., Hitchin, chemists. (M., 4/2/28.) Registered January 14, series of 2nd debentures for £5,000, present issue £1,000; general charge. *£5,000. May 5, 1927.

Satisfaction

TIPPER (B. C.) AND SON, LTD., Birmingham, manufacturers of animal medicines. (M.S., 4/2/28.) Satisfaction registered January 19, £500, part of amount registered October 27, 1925.

Receiverships

GILLIS (A.) AND CO., LTD. (R., 4/2/28.) R. G. H. Adams, of Dowlais Street, West Bute Street, Cardiff, was appointed receiver on January 21, 1928, under powers contained in debenture dated September 24, 1927.

MERCER WARD, LTD. (R., 4/2/28.) H. A. Furber, of 3, Warwick Court, Grays Inn, W.C., was appointed receiver and manager on January 17, 1928, under powers contained in debenture dated March 22, 1922.

London Gazette, &c.

Companies Winding Up Voluntarily

LONDON AND BUDAPEST OIL SYNDICATE, LTD. (C.W.U.V. 4/2/28.) By special resolution, January 7, confirmed January 23. H. B. Hugill, Chartered Accountant, 101, Leadenhall Street, E.C.3, appointed as liquidator.

WASTE OIL REFINERS, LTD. (C.W.U.V., 4/2/28.) W. Elles-Hill, Chartered Accountant, of 41, Bedford Square, London, W.C.1, appointed as liquidator, January 23. Meeting of creditors at liquidator's office, on Tuesday, February 7, at 12 noon, creditors' claims by February 15.

New Companies Registered

BITMAC, LTD. Registered January 27. Nom. capital, £5,000 in £1 shares. Distillers, refiners, blenders and manufacturers of and dealers in tar, tar products, oils, road-making materials, and chemicals, manures, fertilizers, fertilizing products, paints, varnishes, disinfectants, motor spirit, greases, and waste matter, etc. Directors: J. G. Clugston, "Fairholme," Old Brumby, Scunthorpe; L. G. Clugston; R. Jones; J. T. Price; and W. Sandwith.

BUSSEY LOW TEMPERATURE PROCESS, LTD., British Columbia House, Regent Street, London, S.W. Registered January 26. Nom. capital, £15,000 in 1s. shares. To adopt an agreement with E. Harrison and A. Powell and to carry on the business of manufacturing, producing, treating, under any process or method, and selling coal, shale, lignite and other carbonaceous substances and fuels of any kind, and the constituents and by-products of any such fuel. Directors: E. Harrison, A. Powell, L. A. T. Broadwood and C. F. Gifford.

THE CELLULOSE ACETATE SILK CO., LTD. Registered as a "public" company on January 26. Nom. capital, £1,250,000 in 1,150,000 ordinary shares of £1 each, and 2,000,000 deferred shares of 1s. each. To carry on the business of manufacturers of and dealers in acetate of cellulose and any other substances capable of being used in connection with the manufacture of artificial fibres and artificial silk, artificial silk manufacturers, spinners, etc. A subscriber: M. G. Vidler, 10, Balaam Street, Plaistow, Essex.

LEICESTERSHIRE (L. AND N.) COAL DISTILLATION, LTD. Registered as a "private" company on January 27. Nom. capital, £300 in 1s. shares. To carry on the business of distilling coal, cannel, shale and other carbonaceous materials at a low temperature, both experimentally and upon a commercial basis, and of manufacturers of smokeless fuel, oil and other bye-products of coal, shale, cannel and other carbonaceous materials; ironmasters, steel makers and converters, colliery proprietors, coke manufacturers, etc., and to enter into agreements with the L. and N. Coal Distillation, Ltd., and the Leicestershire Colliery and Pipe Co., Ltd., and also to execute an underlease from the said Leicestershire Colliery and Pipe Co., Ltd. Directors: Lt.-Col. J. T. C. Moor-Brabazon, M.P., 115, Eaton Square, London, S.W., F. Hodges, R. D. Hardy, and R. Johnstone.

THE TRINIDAD NATIONAL PETROLEUM CO. (1928), LTD. Registered as a "public" company on January 26. Nominal capital of £1,000 in 5s. shares. To adopt an agreement with the Trinidad National Petroleum Co., Ltd. (in liquidation) and its liquidator, to acquire any lands, concessions, mines, mining leases and rights, metalliferous and petroliferous lands, containing or supposed to contain coal, anthracite, bitumen, oil, clay, iron, copper, lead, tin, silver gold, asbestos, sulphur or other minerals or substances in any part of the world; to prospect for oil, to bore and sink wells, etc. Directors: R. O. Mitchell, 5, Broad Street Place, London, E.C., and J. W. Dyster.

Lorry Explosion Death: Inquest

Verdict of Accidental Death

A VERDICT of accidental death was returned at the resumed inquest, at Hockliffe, Beds, on Friday, January 27, on George Rivett, 22, of Suffolk Park Road, Walthamstow, who was burned to death when his lorry, laden with phosphorus or smoke containers, went over an embankment on the main road near Hockliffe on the night of January 4 (see THE CHEMICAL AGE, January 14, p. 44).

The firm that had filled the shells were Albright and Wilson, Ltd., of Oldbury, Birmingham, and the lorry belonged to the Bulwark Manufacturing Co., of Archway Road, Highgate.

Major J. C. G. Hunter, Inspector of Gun Ammunition for the War Office, said the lorry contained 4.5 in. smoke shells, in boxes. There were 324 shells. The metal parts of the shells were supplied by the War Office and filled by Albright and Wilson. Phosphorus was not an explosive substance, but if it became exposed to the air it caught fire. Great care was taken to ensure that the shells did not leak. These shells were used for putting up a smoke barrage. Asked his theory regarding what happened when the lorry crashed into the orchard, Major Hunter said that probably the burning petrol ignited the boxes containing the shells and a furnace was created. Those shells actually in the furnace would be heated until the charging hole plugs were ejected by the internal pressure. The phosphorus would then be in a molten condition instead of solid, and would bubble and sizzle and burn on reaching the air. Ordinarily the smoke shells were perfectly harmless.

Mr. Alfred A. King, chemist and works manager, of Albright and Wilson, Oldbury, Birmingham, said his firm had for years sent thousands of tons of phosphorus by road. In his long experience he had only known one accident with phosphorus shells, and then the shells, coming from France, were defective.